



University of Chester



**This work has been submitted to ChesterRep – the University of Chester's
online research repository**

<http://chesterrep.openrepository.com>

Author(s): Sumeet K Isher

Title: Does preoperative education reduce anxiety in patients undergoing coronary artery bypass surgery?

Date: September 2010

Originally published as: University of Chester MSc dissertation

Example citation: Isher, S. K. (2010). *Does preoperative education reduce anxiety in patients undergoing coronary artery bypass surgery?* (Unpublished master's thesis). University of Chester, United Kingdom.

Version of item: Submitted version

Available at: <http://hdl.handle.net/10034/125055>

**DOES PREOPERATIVE EDUCATION REDUCE ANXIETY IN PATIENTS UNDERGOING
CORONARY ARTERY BYPASS SURGERY**

SYTEMATIC REVIEW

Miss. SUMEET KOUR ISHER (SEPTEMBER, 2010)

ABSTRACT

The main purpose of the study was to find out whether preoperative education helps in reducing anxiety in patients undergoing coronary artery bypass surgery (CABG), by means of systematic review. About 28,000 CABG surgeries are done in UK every year, but there is variation in terms of number of surgeries from place to place. Patients undergoing CABG faces many psychological issues such as anxiety and depression that may bring the worse outcome of the surgery and even leads to death or another cardiac event. This systematic review brings all these issues into light and 14 relevant studies obtained by search methodology have discussed the issues such as effect of anxiety on coronary heart disease, effect of preoperative patient education on the outcome of the surgery and the different forms of education and their effects. It was reported that anxiety does predict the post operative psychological outcome. Positive association were observed between different forms of education such as support from peer group and music and video information. The systematic review concluded that there is positive effect of education given to the patient prior to surgery, but few more studies need to be performed on large cardiac population to obtained better results for the practical implementation.

ACKNOWLEDGEMENTS

I would like to acknowledge and extend my heartfelt gratitude to **Dr. John Buckley** for his vital encouragement, support and assistance. Special thanks must go to my **family** and **friends**, especially **Hitender**, who stood by my side and has supported me in number of ways.

DECLARATION

I declare that this work is my own work. I declare that this is all my own work and has not been copied in any way from anyone.

Signed:

date:

CONTENTS

Page No.

ACKONWLEDGEMENT	i
-----------------	---

ABSTRACT	ii
----------	----

DECLARATION	iii
-------------	-----

CHAPTER 1 INTRODUCTION

1.0 INTRODUCTION	1
------------------	---

<i>1.1 Physiology of anxiety</i>	2
----------------------------------	---

<i>1.2 Pre-operative and post-operative anxiety in coronary artery bypass surgery</i>	3-5
---	-----

<i>1.3 Anxiety as a causal factor in coronary heart disease (CHD).</i>	5
--	---

<i>1.4 Preoperative anxiety in children undergoing surgery</i>	6
--	---

CHAPTER 2 LITERATURE REVIEW

2.0 SURGERY	7
-------------	---

2.1 Advantages and disadvantages of CABG	7-8
--	-----

<i>2.1.1 off pump and on pump surgery</i>	8-9
---	-----

<i>2.1.2 Awake CABG</i>	9-10
-------------------------	------

2.2 Decision making	10
---------------------	----

<i>2.2.1 Elective and emergency CABG</i>	10
--	----

2.3 Anxiety and its association with CHD and SCD	11-12
--	-------

<i>2.3.1 Possible reasons for developing anxiety in CABG</i>	12-13
--	-------

2.4 Scales used to rate anxiety by the studies and their validity	13
2.4.1 <i>Hamilton scale</i>	13-14
2.4.2 <i>Spielberger state anxiety inventory</i>	14
2.4.3 <i>General well being questionnaire</i>	14-15
2.4.4 <i>SF 36 health status questionnaire</i>	15
2.4.5 <i>Beck depression inventory (BDI)</i>	15-16
2.4.6 <i>Centre for epidemiology studies depression scale (CESD)</i>	16
2.4.7 <i>Crown crisp index</i>	16
2.5 Preoperative anxiety causing poor CABG outcome	16
2.5.1 <i>Effect of gender on CABG and its outcome</i>	18
2.6 Methods of educating the patient	19-22
2.6.1. <i>Understanding heart and need of CABG</i>	22-23
2.6.2 <i>Knowledge about the pre and post surgery (CABG) conditions</i>	23-26
2.7 Effect of education on the CABG outcome and reduction of anxiety	26-29
2.8 Research questions	29

CHAPTER 3 METHODOLOGY

3.0 Search material	30
3.1 Data base search engines	30
3.2 Journals used in review	30
3.3 Key words used to search material	31

3.4 Criteria for the selection of the study	31-32
3.5 Quality assessment	32-34
3.6 Data collection	34
3.7 Statistical analyses	34

CHAPTER 4 RESULTS

4.0 RESULTS	35
4.1 Does anxiety causes CHD and poor CABG outcome?	36-38
4.2 What are the effects of preoperative education on anxiety and CABG outcome?	38-41
4.3 what are the methods of education provided to the patients to reduce anxiety?	41-44

CHAPTER 5 DISCUSSION

5.1 In relation to research question 1, Does anxiety causes CHD and poor CABG outcome?	45-47
5.2 In relation to research question 2, what are the effects of preoperative education on anxiety and CABG outcome?	48-51
5.3 In relation to research question 3, what are the different ways of reducing anxiety in patients undergoing CABG?	51-54

CHAPTER 6 CONCLUSION	55-57
----------------------	-------

CHAPTER 7 REFERENCES

<i>7.0 References for the 14 relevant studies included for this systematic review</i>	58-59
---	-------

<i>7.2 Main references</i>	59-83
----------------------------	-------

APPENDICES I & II

GLOSSARY

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Presently, an acceptable medical procedure for many cardiac conditions (congenital or acquired) is cardiac surgery that includes valve surgery, surgeries done for arterial and ventricular septal defect and coronary artery bypass surgery (CABG). Edelman (1995, chap.9) stated that it is quite unpleasant for anyone undergoing surgery because the medical procedure may provoke anxiety for many reasons. The patients may be concerned about the pain or discomfort they may experience or about the diagnosis and prognosis. For this reason, there are many techniques designed to overcome this situation and to prepare the patient for the surgery. Techniques such as hypnotic procedures, psychotherapy, modelling and informative techniques are designed to reduce the anxiety prior and post surgery.

“Anxiety is an unpleasant emotional state or condition which is characterised by subjective feelings of tension, apprehension and worry and by activation or arousal of the autonomic nervous system” (Spielberger, 1972). Salmon (2000, chap.7) stated that anxiety is pervasive in healthcare and illness. It is categorised into outcome anxiety and procedural anxiety. The former arises from worrying about the results of illness and treatment and the latter relates to the fear regarding the medical procedures. Between these two kinds of anxiety, procedural anxiety must be taken as evidence of a failure of clinician care that results from inaccurate fears about the consequence or what is going to happen.

Salmon (2000) stated that perceiving the surgical procedure is totally different in patients undergoing surgery and the clinician. It becomes relevant to find out the basis of anxiety in patient and to explain them in an accurate and comprehensive way. Salmon (2000) further said that clinical procedure which are routine to a clinician seem dangerous to the patient. Patient's fear reflects misunderstandings which are efficiently corrected. Some of the common fears that patients have presented are given in table 1.

Table 1.

Clinical procedures	Patient's fear
Inflation of blood pressure cuff on a child	"It is too tight. My arm is getting too full of blood. It will burst"
Morphine analgesia postoperatively	"Morphine is dangerous drug. I will become addicted if I have too much"
Barium meal	"Radiation gives people cancer. Perhaps this will give me too."
Colonoscopy	"I might dirty myself in front of everyone"
General anaesthesia	"I always need more painkillers than the proper dose. If they give me normal anaesthesia, I might wake up in the middle of the operation"

Adapted from Psychology of medicine and surgery (2000, pp.101)

This review is done in order to know the pre and post operative effect of anxiety on patients undergoing cardiac surgery. Additionally, it will explain the ways to reduce anxiety in cardiac patients for better life expectancy and outcome.

1.1 PHYSIOLOGY OF ANXIETY

Smith (2008) stated that heart palpitations, muscle weakness, fatigue, chest pain and headaches are the physical effects of anxiety. Whenever, the body has to face the threat, blood pressure and heart rate is increased along with sweating and blood flow to the major groups of muscle. In addition to it, inhibition of immune and digestive system also takes place. Externally, anxiety shows signs such as yellow skin, trembling, sweating and pupillary dilation. Rosen & Schulkin (1998) described that biologically, anxiety is influenced by amygdala and hippocampus. In an unpleasant situation or during any harmful stimuli, it is observed through PET scan (Position emission tomography) that there is an increased blood flow in the amygdala (Zald & Pardo 1997).

1.2 PRE AND POST OPERATIVE ANXIETY IN CORONARY ARTERY BYPASS SURGERY (CABG)

CABG is needed (Thoralf, 2010) when a coronary artery that supplies oxygen and nutrients to the heart, gets blocked with the fatty depositions built up on the inner walls of the

coronary arteries. It is mainly recommended for the patients with left main artery disease, disease of three or more main coronary arteries and abnormal function of the left ventricle which is the main chamber of the heart (as shown in figure 1, page 4). The main purpose of the surgery is to bypass or get around the narrowed part of the coronary artery.

Coronary artery bypass surgery also known as coronary artery bypass graft (shown in figure 1.) was first performed in 1960 by Dr. Robert Goetz, Dr. Michael Rohman along with Dr. Jordan Haller and Dr. Ronald Dee (Dee, 2003, Haller & Olearchyk, 2002) in which the arteries are held together over an metal ring with circumferential ligatures. The donor vessel was the internal mammary artery which was anastomosed with right coronary artery. But it came up with a disadvantage that nine months after the bypass, it was seen by autopsy that an atheromatous plaque was present at the origin of the internal mammary which was used in bypass. Kolessov (1967) stated that the first successful internal mammary artery – coronary artery anastomosis was performed in 1964. Eagle *et al.* (2004) stated that the main indications for CABG are disease of left main coronary artery (LMCA), disease of all three coronary arteries, Left anterior descending artery, Left circumflex artery and Right coronary artery (LAD, LCX and RCA) or diffuse disease that cannot be treated with percutaneous intervention (PCI). Later, CABG was also preferred for high risk patients such as with severe ventricular dysfunction or diabetes mellitus (Eagle *et al.*, 2004).

Coronary Artery Bypass

Figure 1. Adapted from metrohealth.org

Ohki *et al.* (2002) suggested that there are various types of CABG that are performed. They are single bypass, double (two coronary artery) bypass, triple (three vessels LAD, RCA, & LCX) bypass, quadruple (means four) bypass and quintuple (means five) bypass. A person undergone bypass surgery more than two times does not mean that he is “sick”, similarly less number of bypass does not mean that a person is “healthier”.

Hannan *et al.* (2008) described that many studies have shown that CABG are preferred over PCI and it is superior to PCI. The reason behind this superiority is the lower rates of death or myocardial infarction (MI) as compared to treatment with coronary stents and is also because the patients undergoing CABG have shown lower rates of repeat revascularization. Forthcoming surgery is always distressing event for the patient that can trigger emotional, physiological and cognitive response (Gil, 1984). Anxiety in the patients always foretells the amount of stress and it has been observed that the increased anxiety scores are presented by presurgical patients. The level of anxiety depends on age, gender and the motive of the surgery (Jelicic & Bonke, 1991). Gotze & Dahme (1980) stated that the anxiety scores are high in patients undergoing surgery with an uncertain outcome as compared to the surgery

with little doubt about the course of events. Many recent researches have shown a negative relationship between preoperative psychological status of the patient and recovery after the surgery, as there is lack of time and training to sufficiently deal with the psychological problems of the patients undergoing surgery (Stengrevics, 1996).

1.3 ANXIETY AS A CAUSAL FACTOR IN CORONARY HEART DISEASE (CHD)

Edelman (1995, pp.268-270) stated that coronary heart disease is defined as the disease that involves narrowing/blocking of the coronary arteries. Due to this blockage, there is partial supply of oxygenated blood to the heart that causes the person to feel a sharp pain in the chest or arm. Severe blockage of the coronary arteries can result in heart attack or myocardial infarction (MI). Anxiety and coronary heart disease (CHD) are associated with each other. It is quite controversial whether anxiety is the cause or the result of CHD.

Jenkins (1983) suggested that among the psychological variables such as depression, life dissatisfaction, and hypochondriasis, anxiety and nervousness seem to have relation with one or more form of CHD. In addition to it, many studies have shown the relation between angina pectoris and variables of anxiety and neuroticism (Jenkins, 1976). In a Meta analytic review, Booth-Kewley & Friedman (1987) have shown the possibility that anxiety is a casual factor in CHD and have shown that along with higher level of anxiety, higher level of depression, anger and aggression results in heart disease.

1.4 PREOPERATIVE ANXIETY IN CHILDREN UNDERGOING SURGERY

Squires (1995) described the main aspect which a child experiences while hospitalization and that leads to stress. It includes hospital food, clothing, unfamiliar faces, witnessing of parental anxiety, exposure and touching of “private parts” by a stranger. Preoperative anxiety in children may lead to delaying of anaesthesia effect (Kain *et al.*, 1996). Recovery

may be delayed as well due to anxiety as it provokes the release of stress hormones (McCann & Kain, 2001).

Kain *et al.*, 1996 stated the various factors that describe the level of anxiety in children. Factors such as age of the child, anxiety level of the parents, personality, at-home care giving and quality of past medical encounters. It was suggested by study (Kain *et al.*, 1996) that children who are shy in nature, anxious parents, upsetting past surgical experience, are at greater risk of preoperative anxiety. Thereby, it becomes important that along with the children undergoing surgery, education should be given to the parents of the child as well.

Legendre *et al.*, (2010) have shown in their study that a possible alternative to revascularisation is CABG in young children. They have also proved that the rate of long term patency of CABG is high in paediatric population. Campbell (1992) stated that many studies are done on children undergoing minor surgeries but only few have been done in children undergoing major surgeries. It is been observed that in major surgeries, hospitalization along with multiple medical procedures can cause more anxiety and can create a negative behaviour as compared to minor surgeries in children which in return demands even greater need of pre surgical preparation.

CHAPTER 2

LITERATURE REVIEW

2.0 SURGERY

No matter the kind of surgery a person is undergoing, it is but obvious to experience fear and anxiety. Patients will be less anxious in general surgeries such as orthopaedic surgery, head neck surgery ophthalmic surgery, but when it comes to “Heart”, it is quiet normal to get more anxious being a patient undergoing cardiac surgery, because heart is thought to be the seat of the soul (Rothrock, 2007). Parks (2008) stated that patients are more anxious because of the higher risk of complications in a surgery which also includes stroke and death as well. CABG becomes the choice of treatment for patients with >50% stenosis in left main stem disease (Taggart, 2005). The benefits of CABG include freedom from ischemic events at 5 years gained by 75% of patients and at 10 years by 50 % of patients (Kirklin *et al.*, 1989).

2.1 Advantages and disadvantages of CABG

Like two faces of the coin, CABG also has advantages and disadvantages. Looking at the brighter side of the surgery Park (2008) described that in some conditions where several arteries of the heart are blocked; CABG is the useful surgery to fix these problems, whereas, the darker side of the surgery reveals that there are more risks and long recovery time. But long term benefits mostly overweigh these disadvantages of CABG (Parks, 2008). The rate of CABG operative death has been increased by 3 % in the last 15 years (Hannan *et al.* 1995; Calliff *et al.* 1989). It is also seen that 5 to 15% of the patients undergoing CABG experience acute myocardial infarction (King *et al.* 1994; Bruss *et al.* 1992; Braunwald, 1998). Bateman, Matloff & Gray (1984) reported that there is increased hospital mortality (10-15%) seen in the patients who experience myocardial infarction (MI) preoperatively as compared to those who do not have MI preoperatively (1%). Other risks of CABG includes renal failure in 4.9% of CABG, out of which 2% required dialysis and due to this the mortality rate was markedly got increased (Casale & Ulrich, 1994; Kellerman, 1994; Kobrin & Tobias 1992).

2.1.1 off pump and on pump surgery

Shekar (2006) explained that one of the methods in which the heart is stopped to perform the CABG is called as on pump CABG. In such a procedure, cardiopulmonary bypass (CPB) machine also known as heart lung machine is attached to the body that works as an artificial circulation system and performs the function of the heart and the lung by the time surgery is performed. CPB included piped or cannulas which are placed in the heart in order to drain de-oxygenated blood to the artificial pump which purifies it and then the purified blood is drained back to the patient. After constructing the grafts, at the end of the surgery, it is ensured that the operated heart has resumed essential function, and then the CPB machine is detached. Further, Shekar (2006) described that these days on pump surgery is one of the safest procedure with less risk of death and other complications. Schachner *et al.* (2005) reported that in patients stratified with low risk, the average risk of on pump method is 1%-2%.

Detter *et al.* (2002) explained that due to the complications emerged as a result of “on pump” CABG, such as stroke and decrease in high mental function, “off pump” procedure came into existence which is a new technique by means of which CABG is carried out. This new method does not need CPB machine and the surgery is performed on the beating heart. Ehsaan *et al.* (2004) reported that there are many benefits of this procedure for instance a lower risk of stroke, atrial fibrillation, and neuro-cognitive dysfunction have not been confirmed by large clinical trials. Another study carried out by Shroyer *et al.* (2009) reported that patients that have undergone off-pump CABG have shown worse outcomes along with poor graft patency as compared to patients that have undergone on-pump CABG. Bicer *et al.*, (2009) reported that off-pump CABG is quite safe in elderly patients and prove to have high quality of life and lower rate of mortality and morbidity. Mathesin *et al.*, (2005)

reported that the outcomes of on-pump and off –pump methods in patients were similar in terms of health status and overall quality of life.

Overall, Jensen *et al.*, (2006) reported that there was no significant difference seen between on-pump and off-pump in terms of psychological status of the patient, and both the procedure have the same impact, but the decision depends on the surgeon preference in terms of comfortability.

2.1.2 Awake CABG

Kessler *et al.*, (2005) described that although general anaesthesia (GA) is commonly preferred for CABG, but to reduce anaesthetic or surgical morbidity or mortality, many new techniques have been evolved known as “Awake bypass” which involves high thoracic epidural anaesthesia (TEA) which also helps in immediate extubation and has proved to be beneficial in patients with coronary artery disease. TEA is reported to be beneficial in enhancing pulmonary function and reducing pulmonary dysfunction postoperatively along with immediate extubation and less respiratory complications (Scott *et al.*, 2001; Hemmerling *et al.*, 2004). Other benefits of this surgery includes enhancement if coronary and internal thoracic arterial perfusion, reduced arrhythmias and decrease in heart rate (Blomberg *et al.*, 1990). Noiseux *et al.* (2008) stated that patients have shown positive reaction towards TEA, but in patients who are nervous and want to sleep throughout the surgical procedure is never a good choice for TEA. Interestingly, this technique involving awake patient is attractive to many cardio surgeons because the most common fear of a surgeon during the surgery is “fear of not waking up” after surgery. The decision whether the patient can undergo TEA depends on anaesthesiologist and a careful psychological assessment of the patient is also required (Noiseux *et al.*, 2008). Royse *et al.* (2003) were

the first one to report that the use of TEA as postoperatively analgesia helps reducing the risk of psychological morbidity following CABG.

2.2 Decision making

Parks (2008) explained that it is not always the patient that has to choose whether to go for CABG or angioplasty, but it is the doctor that will be deciding which procedure must be followed to save patient's life depending on the severity of the coronary artery disease. The doctor also looks for the long term benefits of CABG and compares it with the lower risk and fast recovery time for angioplasty. Therefore, patient must be fully informed and allowed to participate by asking advantages and disadvantages for the procedure preferred by the doctor and hence, patients can make choice as well that is beneficial for his/her lifestyle and health.

2.2.1 Elective and emergency CABG

Elective surgery as the name shows is surgery that is done at patient's convenience and does not need any medical emergency, whereas, in emergency surgery immediate procedure is needed in order to save patient's life. Seshadri (2002) stated that presently the need for emergency CABG has been decreased but CABG mortality and morbidity rate is still high in the millennium. Boker, Brownell & Donen (2002) reported that preoperative anxiety is experienced by 60% of the patients who undergo elective CABG. Kurki, Kataja & Reich (2003) have observed that there is greater rate of postoperative mortality and morbidity in emergency CABG along with high total cost as compared to the patients undergoing elective surgery. This difference depends on the presence of cardiac risk factors that are present pre operatively.

2.3 Anxiety and its association with CHD (coronary heart disease) and sudden cardiac death (SCD)

Edelmann (1995) stated that it is quite unpleasant for anyone to undergo surgery as it provokes anxiety for number of reasons such as unfamiliarity about the surgical procedure and expected pain and discomfort. Spielberger (1972) defined anxiety as "An unpleasant emotional state or condition which is characterized by subjective feelings of tension, apprehension & worry and by activation or arousal of the autonomic nervous system". Rozanski, Blumenthal & Kaplan (1999) stated that ventricular arrhythmias in anxiety can be the cause of sudden cardiac death. There will be reduced heart rate variability observed in the patients with anxiety disorder (Kawachi *et al.*, 1995) and it leads to change in cardiac autonomic tone. This will increase sympathetic stimulation due to which both arrhythmias and sudden cardiac death (SCD) occur or leads to defective vagal tone (Lown *et al.*, (1973) thereby increasing the number of cardiac mortality (Farrell *et al.*, 1987); Rich *et al.*, 1988). The reduced vagal control results in impaired vagally mediated baroreflex control (Vanoli *et al.*, 1991) which is relevant and crucial risk factor responsible for SCD (Billman *et al.*, 1982); DeFerrari *et al.*, 1995). Kawachi *et al.*, (1994) analysed that the phobic anxiety is strongly associated with fatal CHD. Albert *et al.* (2005) reported in their study that the phobic anxiety at its high level links with high risk of CHD and SCD. Rozanski *et al.*, (1999) explained that the increased anxiety disorder is one of the major risks of sudden cardiac death and this phenomenon behind this is ventricular arrhythmias.

It is observed that the increase in the risk of cardiac mortality arises from preoperative anxiety (Tully, Baker, Knight, 2008). After the diagnosis of coronary artery disease, high level of anxiety leads to high risk of MI or SCD (Shibeshi, Young-Xu, & Blatt 2007). Even though studies on anxiety are not extensively done but Shen *et al.* (2008) supports the hypothesis in their study that anxious older men with CHD are more prone to high risk of MI. Lane *et al.* (2000) demonstrated in their study done on MI patients during the first 12 months post MI,

that anxiety and depression did not seem to be the predictive of prognosis of MI but on the same time, they still persist to be relevant concern for MI patients.

2.3.1 Possible reason for developing anxiety in CABG

The main reason for the stress for CHD patients is the wait for cardiac surgery. Underwood, Firmin & Jehu (1993) performed their study on 68 patients waiting for CABG, and measured depression, anxiety and effect of waiting on social functioning. They scored the anxiety by using hospital anxiety scale and found that 69% of the patients had clinical or borderline states of anxiety (Firmin & Jehu, 1993). In a survey carried out within the patients undergoing CABG and their significant others (Bradley & Williams, 1990) have shown that the major areas they were concern about were the result or the success of the surgery, early postoperative recovery, any complications following CABG, and their ability to return to work. It was observed in this survey that both intra and post operative concerns were similar to both patients and their significant others.

Koivula *et al.* (2001) stated that the uncertainty and waiting for CABG makes many patients more disturbed than their chest pain. As a result of this, such patients can adopt a sedentary life style and lose their active hobbies and normal day activities, sometimes forever, which in return may deteriorate their mental and physical health along with quality of life (Underwood *et al.*, 1993). Arthur *et al.* (2000) described that long wait for CABG can result in deterioration of patient's emotional state and physical activity. It is difficult to avoid this wait; instead, patients can be involved in the programs that can help them to get a better outcome of surgery.

2.4 Scale used to rate anxiety by the studies and their validity

The main scales that are used in different studies performed on patients to rate anxieties are as follows:

- Hamilton anxiety scale
- Spielberger's state-trait anxiety inventory (STAI)
- General well being questionnaire
- SF-36 Health Status questionnaire
- Beck depression inventory (BDI)
- Centre for epidemiology studies depression scale (CESD)
- Crown crisp index

2.4.1 Hamilton anxiety scale

Fahmy (2003) stated that Hamilton anxiety scale (HAS) also known as HAMA or Hamilton anxiety rating scale (HARS), comprised of 14 items that measures the level of severity of anxiety in patients. The main of this scale is to rate r analyse the severity of anxiety in children and adults. This scale was developed by Max Hamilton and can measure overall anxiety, somatic anxiety, and psychic anxiety (Fahmy, 2003). Hamilton (1959) said that HAMA is first scale used to rate anxiety. But even though it is widely accepted and used to rate anxiety in clinical trials, it still criticized because of its weak discrimination between antidepressant and anxiolytic effects (Maier, Buller, Philipp & Heuser, 1988).

Many studies have ranged HAS from fair to excellent on the grounds of reliability. Moras, Di Nardo & Barlow (1992) have implemented in HAS in their study on anxiety patients by different interviewers less than 10 days difference and have observed that the interrater reliability of HAS was fair ($r = .65$) whereas the internal consistency was good ($\alpha = .77$ for first implementation and $.81$ for the second one). The reliability of HAS was excellent ($r = .96$) in another study carried out by Kobak, Reynolds & Greist (1993).

2.4.2 Spielberger's state-trait anxiety inventory (STAI)

Spielberger, Gorsuch & Lushene (1970) described that STAI is a relevant tool to measure anxiety in adults and a special version is made to measure anxiety in children as well. Mindgarden (2008) stated that STAI helps in making clinical diagnosis such as analysing the severity of anxiety in medical, surgical and psychiatric patients. Validity of STAI was reported by Spielberger *et al.* (1995) and explained that the results of STAI are consistent with other anxiety scales. Whereas, reliability of the scale is concerned Rule & Traver (1983) presented that STAI is reliable as shown in the study they carried out on 29 male undergraduate students. Spielberger *et al.* (1995) explained that the implementation of this scale has criteria for its usage such as this scale is not meant for people over the age of 70 years and under high school level. Also, it requires 6 grade reading level to complete it. It is quite time consuming therefore, the practical use of this scale is for mass distribution and completion.

2.4.3 General well being questionnaire (GWB)

Dupuy (1984) stated that GWB questionnaire is self done or with the help of an interviewer and includes 22 items on anxiety, depression, self discipline, positive well-being, vitality and general health. The main aim of this scale is to assess the patient's psychological well-being. This approach is proved to be more positive as compared to other scales meant for quality of life because of the reason that it focuses more on the well-being rather than the disability (Dupuy, 1984).

2.4.4 SF-36 Health Status questionnaire

Ware *et al.* (1993) stated that SF 36 questionnaire is a effective tool to measure the health status in general population and is self administering. Brazier *et al.* (1992) reported in their study that Sf-36 have shown high rate of completion (95%) and high rate of response (83%). (Ware *et al.*, 1993; Ware, 1995) described that SF 36 was compared with other commonly used generic health surveys on the basis of content validity and it has shown that eight most

relevant and frequent measured health concepts are included in SF 36. The main areas of contents that were not included in SF 36 and are present in other health surveys were sleep adequacy, sexual functioning, health distress, self esteem, family support, eating, cognitive functioning, communication and hobbies or recreation (Ware *et al.*, 1993; Ware, 1995). Failde & Ramos (2000) proved in their study done on patients with coronary heart disease and have stated that SF- 36 is one of the beneficial scale to be used in CHD patients as this scale reflects the anxiety level in such patients.

2.4.5 Beck Depression Inventory (BDI)

Beck (2006) described this scale was developed by comparing the word to word explained symptoms from the patients and then by using these words to make a scale that could reflect the severity of the given symptom. It also faces the limitations, firstly, if a person has to fill up the form in a clinical environment or in front of others, it can alter the results (Bowling, 2005) and secondly, Moore, Moore & Shaw (1998) stated that BDI may give wrong result in physical illness because the score may get increase due to illness instead of depression.

2.4.6 Centre for epidemiology studies depression scale (CESD)

Radloff (1977) described this scale as short self report scale for general population for depressive symptoms. By having high internal consistency and adequate test- retest repeatability, this scale is a useful tool for measuring depression in epidemiologic studies.

2.4.7 Crown crisp index

Joukamaa (1992) described that this index also known as Middlesex hospital questionnaire previously, is an effective tool for measuring various neurotic and trait symptoms and its validity is proven in many studies.

It is important for any clinical trial to take the validity of the scale used to rate anxiety as it may alter the result or even make wrong conclusions.

2.5 Preoperative Anxiety causing poor CABG outcome

Anxiety is particularly associated with poor CABG outcome (Brunges & Avigne, 2003; Migneault *et al.*, 2003). Rankin & Karen (1996, chap. 14) stated that patients representing high level of anxiety preoperatively will have high level of anxiety post operatively. Duits *et al.*, (1997) suggested that preoperative anxiety is reliable to predict the symptoms that can occur after the surgery. High amount of anaesthetics are needed in preoperative anxiety (Osborn & Sandler, 2004; Maranets & Kain, 1999) and also causes increase in the secretion of catecholamine that results in hypertension, tachycardia and arrhythmias (Fell *et al.*, 1985; Weissman, 1990). Other aggravating factors that lead to anxiety and depression following CABG are poor social support, a stressful, event in the last one year, low standard of education and moderate or severe dyspnoea (Pirraglia *et al.*, 1999). Many reviews have proved that stress effects autonomic nervous system regulation, platelet activation, activity of the hypothalamo-pituitary-adrenal axis and myocardial effusion (Rozanski *et al.*, 1999; Musselman *et al.*, 1998; & Kubzansky *et al.*, 1998).

Lavie & Milani (2004) stated that increased level of anxiety in the patients undergoing CABG is reported for 20-55%. Acute preoperative anxiety leads to high post operative mortality and morbidity (Pignay-Demaria, 2003). Szekely (2007) concluded that risk of mortality and morbidity following cardiac surgery can be easily risk stratified if, the psychological factors especially anxiety is assessed. Gummert (2005) reported that in Germany 2004, the rate of all procedures performed using cardiopulmonary bypass in patients older than 70 years was 42.8%, where as in year 1994, this percentage as 24.9%. Therefore, another high risk factor responsible for preoperative mortality is the increased age (Geissler *et al.*, 2000). It is

also reported that factor responsible for subsequent cardiac event is post CABG depression (Connerney *et al.*, 2010).

Rosenbloom *et al.*, (2009) stated MI patients with sephanous vein grafts are more prone to risk of death due to anxiety. Vanhout *et al.*, (2004) observed that anxiety and mortality differs on the basis of gender and it was concluded that men have higher risk of death due to anxiety disorder.

Hermann *et al.* (2000) proved in 5 years of follow up large German cohort study that the anxiety is related to improved survival rate. On the contrary, there was no significant relation found between fear and mortality rate (Joukamaa *et al.*, 2001). Allgulander & Lavori (1991) reported high mortality rate in their study done on patients with anxiety disorder and stated that the reason for one third of the mortality was suicide. Anxiety disorder in out-patients have shown high mortality with less suicidal rate (Coryell, 1988; Johnsson Fridell *et al.*, 1996; Warshaw *et al.*, 2000), where as Coryell *et al.* (1982) & Weissman *et al.* (1990) reported double the mortality rate out patients with anxiety disorder.

2.5.1 Effect of gender on CABG and its outcome

Edwards *et al.* (2005) stated that there has been a controversy regarding the effect of gender difference on the outcome of CABG and for this reason there were guidelines that were set by society of thoracic surgeons (STS). These guidelines focused on the use of internal mammary artery (IMA), importance of hormone replacement therapy (HRT), role of glycemic control and use of off pump CABG and are summarized in table 2.

Table 2.

USE OF IMA	HRT	HYPERGLYCEMIA MANAGEMENT	OFF PUMP CABG
IMA is underused in women There will be significant	It is not a significant predictor of mortality in multivariate analysis. HRT can lead to	In women, diabetes is more common as compared to men and its adverse effect if more noticeable in women.	Increased improvement after off pump CABG as compared to on pump is associated with the increased use of IMA

reduction in the mortality after using IMA. At least one IMA used to stenotic coronary artery.	complication such as thromboembolism. It is not used in post menopausal women.	It produces higher risk in CABG. Blood glucose level must be maintained at less than 150mg/dl.	with off pump CABG. Because of the lack of evidence that the off pump is superior, these guidelines suggest that men and women have same indications for off pump CABG
---	---	---	---

Adapted from annals of thoracic surgery (2005), 79: 2189-2194.

Females have shown high occurrence of preoperative anxiety and is also seen in patients who are undergoing surgery for the first time, are young and those who ask too many questions about the surgery (Maranets &, Kain, 1999; Moerman, van Dam, Muller & Oosting, 1996; Sun, Hsu, Chen & Shaw, 2008). Edwards *et al.* (1998) reported that women are more prone to hospital mortality following bypass grafting than men. The factors that are responsible for this difference are that anatomically, female coronary arteries are of smaller size which can make the surgery difficult and can end up in incomplete revascularisation (Abramov *et al.*, 2000). Verbrugge (1985) stated that the gender difference can be explained by the two reasons, firstly, men have more cardiovascular disorder and be affected more with comorbid anxiety and secondly, unlike women who shares such feeling with people and are able to manage feelings of anxiety, men are less proficient while handling it. Penninx *et al.* (1999) described that mostly, men do not prefer to report the feelings of anxiety and in case they do it, they might have worsen their condition by that time which in return affect their physical health and may lead to earlier death.

Increased anxiety disorder in women leads to risk of developing hypertension (Cincirpini, 1986; Julian *et al.*, 1989). Whereas, some studies have found that the anxiety disorder in women leads to prevalence of diabetes in women (Gordon *et al.*, 1997; Eaker *et al.*, 1989; Khan *et al.*, 1990; Herlitz *et al.*, 1995)..

The above studies have shown that anxiety leads to poor CABG outcome and steps must be taken to decrease the rate of mortality due to these psychological issues. One of the non-

pharmacological interventions is preoperative education to the patient, but the question arises that what are the ways by which this education or the information can be delivered effectively for better outcome.

2.6 Methods of Educating the patient

Institute of Medicine (2004) suggested that it is important for every patient to have basic health information in order to look after themselves and make good decisions for their health. The main aim of this information is not only to make patients understand health but also to implement the information provided to them. It is noticed that high rate of re-hospitalization and low health status occurs in patients with poor health literacy (Institute of Medicine, 2004).

There has been an increment seen in the need of providing important and comprehensive information to the patients undergoing surgery. The process of patient consent focuses on patient's self determination and access to information and this information given preoperatively helps patient to participate in the decision making process as well. Many surgical patients often get agitated by provided informative pamphlets and forms as patients find this information complex to understand and hard to fill (Hopper *et al.*, 1995; Hopper *et al.*, 1998; McCormack *et al.*, 1997; Lynoe *et al.*, 1991). Lloyd *et al.* (1999) & Gattellari, Butow & Tattersall (1999) stated that most of the patients find it difficult even to remember the details of the information given to them. Johansson *et al.* (2005) reported that only leaflets provided for patient education will not have beneficial effect unless and until they are given with some written or oral information. Gustafson *et al.* (2002) analysed that information provided with the help of websites have shown higher rate of patient satisfaction and have enhanced patient's self efficacy and health behaviour. Utriya-prasit, Moore & Chaiseri (2010) proclaimed that to get better CABG outcome, audiotapes can be

given to the patient to prepare them for the surgery. It is observed that music also plays an important role in reducing anxiety specifically in older people undergoing CABG (Twiss, Seaver & McCaffrey 2006).

Bates (2001) said that it is relevant to provide sufficient information such as risks, benefits and any complications of the surgery to the patient before procedure in a comprehensive way so that the patient understands each and every part of the information. Some studies have assumed that unnecessary anxiety develops if the information regarding the risks and the complications are given to the patient (Stenchever, 1991; Schindele, Renggli & Hackenbruch, 2001) but on the other hand it is observed that anxiety reduces with the improvement in patients knowledge about the surgical procedure (Lloyd *et al.*, 1999; Dawes & Davison, 1994; Sanwal, Kumar, Sahni & Nundy , 1996).

Edelmann (1995) stated that it is important to take provision of information into consideration in order to get better outcome and there are two kinds of information that are given to the patient undergoing surgery.

- Procedural: relates to the medical event explaining that where are when it will take place, and
- Sensory: explaining the patient about the sensations that he/she can feel during or after the procedure.

Shepherd *et al.* (2000) stated that many studies have proved the positive effect of written information provided preoperatively and have shown better understanding among the surgical patients. It has been observed that written protocol helps the patients to recall the information postoperatively as well (Asker, Pearson & Cryer, 1990; Lewis, O'Keefe & Adcock, 1991). Edwards (1990) analysed the benefit of printed version of information that helps the

patient to go through it as many times as he/she can and even the patient finds the written information easy to discuss with the family and friends. It is natural to undergo emotional stress before undergoing surgery and at that point oral information does not seem to have any beneficial impact on the patient (Eden, 1990) therefore, providing the oral information in combination with written information to the patient is quite advantageous (Lynoe *et al.*, 1991; Edwards, 1990).

Bunker (1983) affirmed that the written information given should be in simple language avoiding jargons or any difficult medical terms and adding any anatomical or surgical drawing in written information will help patient understand clearly. Making the patient understand what exactly the heart is and why CABG is required in laymen language is beneficial.

2.6.1 Understanding heart and need of CABG

Heart is a muscular organ which supplies blood to the other parts of the body. It has 4 chambers or parts (Figure 2). It receives impure (deoxygenated) blood from superior and



Figure 2. Adapted from fit4everyoung.com

inferior vena cava. It pumps out pure (oxygenated) blood to the parts of the body. The 4 chambers include 2 atriums (left and right) and two Ventricles (left and right) (Rothrock, 2007). Disease or blockage of left main coronary artery (shown in figure 3), all three coronary vessels and patients with severe ventricular dysfunction leads to the need of CABG (Eagle *et al.*, 2004).



Figure 3. Adapted from texheartsurgeons.com

2.6.2 Knowledge about the pre and post surgery (CABG) conditions

Cirone (1999) stated that the patient undergoing CABG must be explained the important information about the surgery, which includes the reason for the surgery, expectations before and after surgery and reducing the risks following CABG.

- Reason for CABG: A patient needs to be told about the positive effect of CABG as the surgery will restore normal blood supply to the heart. Also, information regarding a part of vessel that is to be removed from another part of the body will be grafted above and below the blocked part of the artery to improve the blood supply must be explained to the patient.

- Before and after surgery: patient must be told about the sedatives that will be given before the surgery to make him relax. The patient may have to undergo pulmonary artery catheterization preoperatively, therefore, he must know that those pipes will remain there after the surgery and will cause slightest discomfort. While explaining post CABG condition, it must be ensured that the patient knows about the machine such as mechanical ventilator and intubation which are quite frightening for a patient. Patient must be taught about short term post operative measure such as the number of days he/she will be staying in the hospital after the surgery and explaining about the importance being relaxed as stress and anxiety slows down the recovery. Patient might get swelling in the legs post CABG, therefore, to reduce the swelling, patient must be told to avoid crossing of the legs, wear stockings and keep the legs elevated repeatedly.
- Re-occlusion risk reduction: patients must be informed about the healthy life style such as diet low in saturated fats and cholesterol in order to avoid the risk of arterial re-occlusion. In addition to it, patients must be taught different signs of re-occlusion such as angina, fever, dizziness, shortness of breath at rest etc., so that the patient feels those signs, he/ she can report immediately to avoid another cardiac event or complications.

Lamarche, Taddeo & Pepler (1998) informed that preoperative education to the patient gives a helping hand to the recovery, increases patient's satisfaction and reduces the complications post surgery. Most of the patients feel anxious before the surgery; therefore, educating the patients on appropriate time is beneficial for better outcome. Fanning (2004) affirmed that patients would not be able to recall or grasp the information for long time if their anxiety level is high. Cupples (1991) analysed that 5 to 14 days before CABG state level anxiety will be lower and this is the appropriate time to deliver the information to the

patient. Fanning (2004) suggested that most of the CABG patients are admitted to the hospital on the day of surgery which does not give enough time to educate them, therefore making the patient to visit hospital certain days before the surgery for preadmission testing will be beneficial for teaching. The main points taken into consideration while providing pre operative education are summarized in table 3.

Table 3.

Focus Points for Preoperative Patient Education

Adapted from <http://www.nursingcenter.com>

Ward, Constancia, & Kern (1990) suggested that preoperative anxiety can be reduced by making the patient meet the former surgery patient to gain confidence and to clear out the doubts of the current patient. Along with the patient, the role of educating patient's family is also important such as how the patient will appear after the surgery, what are the equipments attached to the patients and the unfamiliar noises (Ward et al., 1990).

Since there are many ways to provide the effective education to the patient preoperatively, but the main concern and the purpose of this systematic review is to bring the positive effect of this education into light and to know the limitations of various approaches already been performed in the studies, so that in future, those limitations should be left behind and effective methods should come into practice.

2.7 Effect of education on the CABG outcome and reduction of anxiety

National task force (1979) defines patient education as **the process of influencing behaviour, producing changes in knowledge, attitude and skill required to maintain and improve health. The process may begin with the imparting of information, but it also includes interpretation and integration of information in such a way as to bring about attitudinal or behavioural changes that benefit a person's health status.** Kapnoullas (1988) stated that in early 70's, it was believed that a lack of education or knowledge to the patient would be helpful in reducing anxiety and fear in patients regarding forthcoming events, but presently, it is quite understood that lack of patient knowledge may cause anxiety and could lead to another cardiac event.

The need of increasing the communication between patients, the family of the patient and the health care provider is the need of the hour (Miracle & Hovekamp, 1994; Underwood *et al.*, 1993). There are many studies that have been done to find out the post operative effect of preoperative education given to CABG patients, meta-analysis of these studies have proved the positive outcome of the education (Devine and Cook, 1983). Shuldham (2001) suggested that lots of studies are being done to find out the impact of preoperative education on the outcome of CABG, but only few studies have shown the positive impact of education.

Furze *et al.*, (2009) performed a study 204 patients waiting for CABG in which the primary outcome was anxiety and suggested that physical functioning and cardiac misconceptions can be reduced if nurse counselling is provided to the patients prior to CABG along with the cognitive behavioural intervention. Richman *et al.* (2005) stated that the higher risk of CHD is associated with the negative emotions such as anger, anxiety and depression, where as

Tomkins (1963) defined the positive effect such as the feeling of contentment, happiness and excitement always have positive effect even in illness.

Davidson, Mostofsky & Whang (2010) analysed in their study that increased positive effect could lessen the chances of CHD incident. Asilioglu & Celik (2004) have reported in their study that patients undergoing open heart surgery who received preoperative education will have low score of anxiety as compared to those who have not got the education preoperatively. Rymaszewska, Kiejna & Hadrys (2003) affirmed that the level of anxiety is increased after CABG due to various factors such as time of intubation, number of days stayed in postoperative intensive care unit (ICU) and the post surgical complications. In a comparative study in which the pre and post discharge education was analysed, Fredericks (2009) stated that education provided to the CABG patients at two different points such as before and after the surgery may enhance patient's knowledge about self care.

Shuldham, Fleming & Goodman, (2002) have shown in their study performed on 356 cardiac patients. Among these patients, 188 patients were under experiment and other 168 were under control group. The experiment group was given the intervention by multidisciplinary team before the admission for the surgery. Usual care such as at the time of admission and throughout the hospital stay was given to both the groups. The tools that were used to measure were the Hospital Anxiety and Depression scale, the SF-36 Health Status questionnaire, pain measurement tool and the General Well-Being questionnaire and measurement was taken at the time of entering the study, prior to randomization, and at 3 days, 6 weeks, 3 months and 6 months following surgery. This study proved that 6 months after the surgery there were no significant differences seen in the groups in the main outcomes namely anxiety ($P=0.09$) and pain ($P=0.48$), or in depression ($P=0.62$) and wellbeing ('worn out' $P=0.11$; 'tense and uptight' $P=0.29$). It was also seen that the experimental group have shown a significant difference in length of hospital stay ($P=0.01$).

This clearly shows that education given by the tools that were used in this study were not up to the mark and show some limitations therefore, it became relevant to opt for better anxiety measurement tools in order to get better outcome and health status of the patients. As far as quality of life (QOL) is concerned, it is observed that QOL also gets enhanced with health education in CABG patients (Babaei *et al.*, 2007).

Sorlie *et al.*, (2007) explained the positive impact of video information in combination with individualized session. In this study, the video information regarding the surgery was given to the patients preoperatively and while admission session which gave rise to the questions from the patient side and all worries were answered.

Lewandowski, Good & Draucker (2005) stated that from the last two decades, guided imagery is playing an important role not only in reducing preoperative anxiety but also reducing post operative pain. Halpin *et al.* (2002) analysed that there is positive effect of guided imagery on preoperative anxiety and it also reduces post operative pain. Therefore, this is another form of education given in the form of audio and visual aid. Gonzale *et al.* (2010) reported that guided imagery proved to be an effective tool for patient going for same day surgical procedure as their anxiety levels get reduced, patients report less pain and it also leads to early postoperative anaesthesia care unit (PACU) discharge.

It was observed that the anxiety present in CHD long after CABG patients can be reduced by gaining peers and professional social support (Koivula *et al.*, 2010). It is reported that peer support can enhance recovery after CABG as this approach is quite advantageous (Parry *et al.*, 2009). Lie *et al.* (2007) suggested that patients with pre-surgical anxiety can be benefited by home based intervention program (HBIP) that provides information in a structured or planned method. There was no effect of oral information, pamphlets and surgeon's

personal attention on the anxiety levels and well being of the patient, (Bergmann *et al.*, 2001).

2.8 RESEARCH QUESTIONS

The main aim of this review is to clarify the following questions:

- Does anxiety causes CHD and poor CABG outcome?
- What are the effects of preoperative education on anxiety and CABG outcome?
- What are the different ways of reducing anxiety in patients undergoing CABG?

CHAPTER 3

METHODOLOGY

3.0 SEARCH MATERIAL

Specific scientific publications and search engines were used to search abstract of the articles that are available online.

3.1 Database search engines

- Google scholar
- Pubmed
- Sage journals online
- Science direct

3.2 Journals used in review

- American heart Journal
- AHA Journal (American heart association)
- American Journal of psychiatry
- American Journal of emergency medicine
- British medical Journal
- European heart Journal
- Heart and lung
- Journal of clinical epidemiology
- Lancet
- Oxford Journal
- The Journal of the American medical association
- Journal of the neurological sciences
- The New England Journal of medicine (NEJM)
- The open cardiovascular medical Journal

3.3 Key words used to search material

Specific key words were used in order to manage the certain number of search results. While searching an article or review, the search was limited to title and abstract, but when the title search is not easily accessible then the advanced search was applied. The key words that were used at first were as follows:

- Anxiety,
- Coronary heart disease,
- Coronary artery bypass surgery outcome, and
- Preoperative education
- CABG mortality and morbidity
- CABG complications

At the level of search, approximately 150 results were obtained, and then the key words were limited to “elder CABG patients” and “pre and post anxiety in CABG”. Further, using the title of the research question such as “effect of anxiety on coronary heart disease”, search was refined.

Search was also conducted in a detailed manner on the reference list of the original research paper. The articles were retrieved free electronically from the university of Chester website via Chester online IBIS resource facility and via Athens login through university website.

3.4 Criteria for the selection of the study

The study were included if they met the following criteria

- If the study was in English language,
- If the study was performed on humans (aged 18 and above),

- If the study is performed on the patients with cardiac disease, undergoing/ recovering CABG,
- If the study is randomly performed by including control and intervention groups, and
- Studies that can be easily accessed or having links to full text

Moher, Schulz & Altman (2001) stated that randomised trials give out the reports that are relevant for the health professionals to find out the effectiveness of the treatment and to make future decisions and implications. Moher et al. (2010) said the benefit of proper randomisation is that it helps in the elimination of the selection bias, selection of the treatment and makes a balance between both known and unknown prognostic factors. The most accurate method to find out the association between the treatment and its outcome is randomised control trials (Sibbald & Roland 1998). It would not be incorrect to call these randomised control trials as most effective and powerful tool for any health care and medical research (Kane, Wang & Garrard, 2007).

3.5 Quality assessment

Centre for reviews and dissemination (CRD), (2009) stated that the main purpose of assessing the quality of the study is to find out that how close the results of the study are to the truth and how relevant are they in particular patients or settings. Furthermore CRD, (2009) stated that following are the considerations to be taken while assessing the quality of the study:

- Risk of bias
- How appropriate is the study to obtain the research outcome
- Choice of outcome measures
- Points regarding statistics
- Quality of reporting, and

- Quality of treatment.

The studies used in this literature review are assessed with the help of Jadad scale. Jadad scale also known as Jadad Scoring system or Oxford scoring system is a useful method for assessing the methodological quality of a clinical trial and is most widely accepted and implicated assessment used for assessing the studies (Haynes *et al.*, 2005; Olivo *et al.*, 2008). Armijo *et al.* (2008) affirmed that Jadad scale is also commonly used in health care community. Jadad *et al.* (1996) stated that the scale ranges from 0 (very poor) to 5 (genuine) and included 3 point questionnaire on the basis of which the study is assessed and scored.

The three questions are as follows:

- Was the study described as randomized?
- Was the study described as double blind?
- Was there a description of withdrawals and dropouts?

Jadad *et al.* (1996) also gave out some additional points for the underlying reasons:

- The method of randomisation was described in the paper, and that method was appropriate.
- The method of blinding was described, and it was appropriate.

And for deductions points Jadad *et al.* (1996) gave these underlying reasons:

- The method of randomisation was described, but was inappropriate.
- The method of blinding was described, but was inappropriate.

Like two faces of the coin, Jadad scale have faced some criticism as well, for being incorrect, giving too much importance to blinding and for being over-simplistic (Clark *et al.*, 1999; Shukla, Bai, Milne & Wells, 2007).

3.6 Data collection

Data is collected by using various search engines that gave access to various articles, abstracts, papers and electronic books. Related articles were also obtained via accessing the articles and abstracts obtained by using keywords.

3.7 Statistical analyses

In this systematic review, no statistical analyses are carried out but the main findings in the form of significant difference (p value) and standard deviation (SD) are assigned in the tables given in appendix I.

CHAPTER 4

RESULTS

4.0 RESULTS

The research questions under section 2.8 will be answered on the basis of the results obtained from the studies included in the literature review, and will be discussed in this chapter. From the first selection based only on title, total 150 practicable studies were found, out of which 25 were available in full text. Out of those 25, there were 14 relevant studies included in this literature review based on the quality of the study, tabulated summary of which is given in appendix 1. The selected 14 studies were included because:

- The studies were focusing on different methods of patient education, and
- The studies involved patients with CHD and undergoing coronary artery bypass surgery.

The exclusion of the studies was based on non-randomised trials, studies with only abstracts, studies involving inaccurate patient groups and studies with inappropriate interventional methods. Generally, the publication year of these 14 studies ranges from 2001 to 2009 and are in English language. Out of these relevant 14 studies, the main purpose for these studies were to relate anxiety with CHD and poor CABG outcome. Among rest of the 10 studies, 5 studies were focusing on the effect of preoperative education on CABG outcome and 5 were done to find out the effective methods and timings of education provision to the surgical patients. The results will be discussed according to the research questions and the studies related to the specific question will be summarized in respective tables.

4.1 Question 1 Does anxiety causes CHD and poor CABG outcome?

The studies that have discussed the relation between anxiety and CHD as well as with CABG outcome are summarized in table 4.

Table 4.

STUDY	QA (JADAD SCORE)	TOS	PATINETS RECRUITED	MAIN OUTCOME
Rosenbloom <i>et al.</i> , 2009	3/5	Research	1317 patients, aged 21-74 years	High level of anxiety causes higher incidence of MI and SCD
Rymaszewska <i>et al.</i> , 2003	3/5	Research	53 patients, 37 men (aged 43-74 years) & 16 women (aged 45-75 years),	Preoperative anxiety scores can predict the post operative psychological outcome
Szekely <i>et al.</i> , 2007	3/5	Research	180 patients with cardiac history	Pre operative anxiety assessment leads to lower rate of mortality
Vanhout <i>et al.</i> , 2004	3/5	Research	659 patients, aged 55-85 years	Association between anxiety and mortality is more in older men

QA= quality of assessment, TOS= type of study

There are four main studies out of 14 that explained the association between anxiety and CHD and outcome of CABG. Among these 4 studies, 3 studies have used STAI scale to measure the anxiety levels, though the strategy for using this scale was different in each study, and 1 study has used centre of epidemiology studies depression scale (CES-D). Rosenbloom *et al.*, (2009) used STAI to measure anxiety among 1317 recruited patients and have shown anxiety both in patients with diagnosed General anxiety disorder (GAD) and in those without GAD. STAI score were spilt down using <40 as minimal symptom and >40 as moderate to severe symptoms. After 4.3 years of follow up, results have shown that MI and death occurred in 122 patients. Results also revealed that 10 point increase in STAI score causes 24% increase in death or MI. For anxiety alone the hazard ratio was 1.37 ($p= .74$) and for depression alone was 1.18 ($p= .74$) which represents that there is no difference observed in anxiety symptoms with the presence of symptoms of depression. Rymaszewska *et al.*, (2003) used STAI along with BDI questionnaire in 53 recruited participants and examine them at three different times, firstly few days before the surgery, secondly, after the surgery and lastly, 3 months after the surgery. Linear correlation to investigate the variables were

analysed through regression analysis. In test group, 39.6 % of patients have shown readiness to react with anxiety. The results revealed that the anxiety trait was 47.9 in women ($S.D=7.8$) and 41.2 in men ($S.D= 7.9$). it was also reported that the results were worse for psychic well being ($p=0.000$), physical efficiency ($p= 0.036$) and for satisfaction regarding the surgery ($p=0.028$). High level of state anxiety prior to surgery was shown by 54.7% of the patients, 34% have shown post operatively and 32% presented 3 months after surgery. This concluded that patients having preoperative anxiety have shown high level of anxiety 3 months after the operation as compared to other participants.

Szekely *et al.*, (2007) also used STAI scale and the obtained score from this scale was 44.6 +/- 10 points. Among 180 patients included in the study, 104 scored more than 45 points and 76 scored less than 45 that show that the presence of preoperative anxiety was in 42 % of the population. It was also reported that State-anxiety level was higher preoperatively than post operatively. But Trait-anxiety score was same pre and post operatively except when the scores are taken 12 months after the surgery. This study also reported that individual difference in anxiety symptom can be clearly indicated by Trait-anxiety. Therefore, this study applied Trait-anxiety score instead of State-anxiety and has shown that people with STAI-T score more than 45 had higher rate of mortality. It was also seen in 4.3 years follow up that 26.2 % of population were hospitalized once, 18.8% got admitted twice and 11.5% got admitted three times or even more than that due to angina, MI, congestive HF or arrhythmias. These reasons for hospitalisation were present in the participants who had STAI-T score more than 45.

Vanhout *et al.*, (2004) performed study on 659 participants and used CESD scale with recommended score cut off score of 16 and above. The mean age of the participants was 70.6 years and among 659, 380 were females. Anxiety disorder was present in 112 patients (17%). 6 month ago general anxiety disorder was present in 77 people, panic disorder was

present in 16 people, 36 represented phobia and obsessive compulsive disorder was presented in 9 (9 women). It was reported from this study that females are more prone to have anxiety than men, but men were more prone to suffer with conditions like stroke, cardiac disease as compared to women. In this study after 7.5 years of follow up, the results revealed that 199 people have died out of which 110 were males. The hazard ratio for the rate of mortality in men was 1.78 (95% CI) and 0.89 in women (95% CI).

4.2 Question 2. What are the effects of preoperative education on anxiety and CABG outcome?

The studies that have discussed the effect of preoperative education on anxiety and CABG outcome are summarized in table 5. There are 5 studies that reflect the effect of preoperative education on the outcome of CABG but they vary on the basis methods and programs used in their intervention.

Table 5.

STUDY	QA (JADAD SCORE)	TOS	PATINETS RECRUITED	MAIN OUTCOME
Asilioglu & Celik (2004)	3/5	Research	100 patients recruited, 50 control and 50 intervention group	Lower scores of anxiety were present after provision of patient education
Furze <i>et al.</i> , 2008	3/5	Research	204 patients enrolled	HeartOp program reduces health misconceptions and depression
Babae <i>et al.</i> , 2007	3/5	Research	70 patients , aged 45-65 years	Health education enhances quality of life
Lie <i>et al.</i> , 2008	3/5	Research	185 patients, aged 18-80 years	Home based intervention have positive effect on CABG outcome
Shuldham <i>et al.</i> , 2002	3/5	Research	356 patients, aged 18 years and above	No effect of preoperative education and there is associated increase in the length of hospital stay

QA= quality of assessment, TOS= type of study

Asilioglu & Celik (2004) provided self evaluation questionnaire to the control group, whereas, interventional or experimental group received preoperative education along with the self evaluation questionnaire. Both groups were matched through various variables such as age, sex, educational level, type of surgery and marital status. The results have shown no significance difference seen in trait and state anxiety levels ($p > 0.05$). Even no effect of different variables on anxiety levels in both groups has been observed. But interventional group represented lower score as compared to the control group and even the participants were satisfied with the education provided to them preoperatively by the trained researcher.

Furze *et al.*, (2009) performed the study with randomised 100 patients in experimental group and 104 in control group patients who were waiting for their elective CABG for the first time. HeartOp program was given to the experimental group and the results have shown benefit of HeartOp program on anxiety hence, no significant difference. But this program does have a positive effect on depression ($p=0.008$), physical functioning ($p=0.001$) and cardiac misconceptions ($p<0.001$). In addition to it, according to the data produced by the intervention, HeartOp program is likely to be considered cost effective. Lie *et al.*, (2007) performed their study to analyse the effect of home based intervention program (HBIP) on anxiety levels 6 months after CABG. Total 203 elective CABG patients were recruited out of which only 185 completed the study and were randomised into intervention ($n=93$) and control group ($n=92$). The intervention group was provided with the special home visits at 2nd and 4th week after the surgery and were given face to face education by a trained nurse. Participants were measured through HAD scale before the surgery, 6 weeks after the surgery and 6 months post CABG. At 6 month follow up, patients were again given the questionnaire and were analysed. The results revealed improvement in anxiety and depression in both the groups. Moreover, in patients with baseline anxiety/depression in

predefined subgroup ($n=65$), intervention group ($n=29$) presented enhancement significantly higher than the control group ($n=36$), $p<0.05$).

Shuldham *et al.*, (2001) involved 356 people randomised into 188 experimental group and 168 control group. Intervention in the form of full day education was given to the experimental group by trained team members a day prior to the surgery. Usual care was given to both the groups. Randomisation took place by computer generated data. SF-36 was used to measure patient's characteristic and anxiety was measured by HAD scale. 6 months after the surgery, the results have shown no significant difference between the two groups in terms of anxiety ($p=0.09$), pain ($p=0.48$), well being ($p=0.11$) and depression ($p=0.62$). But length of the hospital stay has shown significant difference which was longer in experimental group. Therefore, this form of education was not sufficient to bring the significant difference and had no positive effect on the CABG outcome.

Babaei *et al.*, (2007) performed this study on 70 CABG patients randomised into control ($n=35$) and intervention group ($n=35$), to make out the effect of the health education on the quality of life after the surgery. 3 days prior to surgery and 4th week after the surgery all the recruited patients were interviewed by administering face to face questionnaire that comprised of 118 questions and it consumed 20-25 minutes. Control group ($n=35$) has the mean age of 53.5 years and intervention group has 52.8 years. Results have shown no significant difference between two groups in terms of age, status of the job and level of education. But knowledge and attitude have shown significant difference after the education provision. The standard deviation of QOL before and after the education provision was 82.79 and 70.45 respectively.

4.3 Question 3 what are the methods of education provided to the patients to reduce anxiety?

The studies that have discussed the methods of education to reduce anxiety are summarized in table 6. There are main 5 studies that discussed the methods by which the education is provided along with their effect on CABG patients.

Table 6.

STUDY	QA (JADAD SCORE)	TOS	PATINETS RECRUITED	MAIN OUTCOME
Bergmann <i>et al.</i> , 2001	3/5	Research	60 patients, 30 experiment group and 30 in control group	Pamphlets along with oral information does not affect CABG outcome
Fredericks <i>et al.</i> , 2009	3/5	Research	130 patients, 66 pre discharge group and 64 in post discharge group	No effect of individualised patient education on CABG outcome
Parry <i>et al.</i> , 2009	3/5	Research	P5 patients randomised into 45PSG (experimental) and 50 UCG (control)group	Peer support program enhance CABG recovery
Sorlie <i>et al.</i> , 2007	3/5	Research	109 patients, 55 experiment group and 54 in control group, aged less than 68 years.	Video intervention have positive effect on CABG outcome
Twiss <i>et al.</i> , 2006	3/5	Research	86 patients, 42experiment group and 44 in control group.	Music reduces anxiety and time of intubation in older CABG patients

QA= quality of assessment, TOS= type of study, PSG=peer support group, UCG=usual care group

Bergmann *et al.*, (2001) involved 60 heart patients including both men and women and were randomised into group 1 that is control group ($n=30$) and group 2 or intervention group ($n=30$). Patients were kept blinded regarding the allotment of the group. Control group was provided with the routine medical information in a form of pamphlet, whereas comprehensive and thorough oral education was provided to the experimental group by one of the surgeon along with the same pamphlet that was given to the control group. STAI scale was used to measure the anxiety at 6 different points and are as follows:

- I immediately after hospital admission, 3 days before surgery
- II after receiving medical information, 3 days before surgery
- III 2 days before surgery

- IV day before surgery)
- V on the way to the operating room [OR]
- VI after the induction of anaesthesia
- VII first day after surgery
- VIII sixth day after surgery.

There was no significant difference in state anxiety seen in males and females ($p= 0.82$) and also between both groups ($p=0.43$). Before providing the education the state anxiety presented by group I and II are given in table 7.

TABLE 7.

STATE ANXIETY	GROUP I	GROUP II
POINT I	40.6	39.2
POINT II	37.7	36.4
POINT IV	37.7	37.2

Except point II, state anxiety did not change further. Even state-trait anxiety score did not represent any significant difference neither between the groups ($p= 0.96$) nor between males and females ($p= 0.94$). Fredericks (2009) performed study on 130 patients out of which 65 were assigned to pre-discharge group and 64 to post discharge group. When anxiety level is measured before the education, both groups differ ($p= 0.001$). On average pre discharge presented high anxiety (mean 69, SD=15) level than the post (mean 32, SD=15). As far as timings is concerned, there was no significant difference observed in terms of knowledge between both the groups overtime ($p= 0.05$). Even though pre discharge group presented high score on self care behaviour than post, still, these scores cannot be accepted as clinically significant.

Sorlie *et al.*, (2007) used BDI, SF-36 and self rating depression scale for their study performed on 109 patients who are randomised into control ($n=54$) and intervention group

($n=55$). Variance of the outcome variables were examined by using MANOVA. On discharge, intervention group presents less anxiety ($p=0.046$) as well as improved health ($p= 0.005$). During the phase of follow up, intervention group presented enhanced health ($p= 0.000$), low levels of anxiety ($p>0.004$) and at 6 months to 2 years follow up phase, less depression ($p>0.004$) was noticed after discharge.

Parry *et al.*, (2009) involved 95 patients (men/women) who were undergoing non emergency CABG, and were randomised into experimental ($n=45$) and control group ($n=50$). Experimental group was provided with the specific education and support through telephone for 8 weeks following discharge from the hospital. 98% of the patient in experimental group were satisfied with the peer support and reported improved physical functioning ($p=0.12$), along with reduced pain ($p=0.20$) and enhanced enrolment in cardiac rehabilitation ($p= 0.11$). Hence, there is positive impact of peer support on CABG outcome.

Twiss *et al.*, (2006) performed the study to find out the effect of music on anxiety of CABG patients. STAI scale was used to measure anxiety in control ($n=44$) and experimental group ($n=42$). One way ANNOVA was applied for measuring the post surgery state anxiety score. There was less anxiety shown by experimental group than the control group ($p=0.022$). Following surgery, the difference in the mean standard deviation for experimental and control group were 9.53 and 11.53 respectively. Other important effect of this method was the shortening of the length of intubation time. Significant difference was seen in length of intubation measured by one way ANNOVA ($p= 0.048$).

CHAPTER 5

DISCUSSION

5.0 DISCUSSION

5.1 In relation to research question 1, Does anxiety causes CHD and poor CABG outcome?

An independent risk factor for all cause mortality in patients who have undergone CABG is anxiety and is the main cause of concern in patients with CHD (Szekely *et al.*, 2007). Few studies have reported that anxiety in stable CAD patients show worse prognosis (Smith & Lesperance 2008). Rosenbloom *et al.* (2009) found no significant effect of anxiety on atherosclerotic progression in patients with saphenous vein grafts which supports the results of study that reported that in healthy individuals, there is no effect of anxiety seen on progression of atherosclerosis of carotid arteries (Stewart *et al.*, 2007). Narita *et al.*, (2007) proved in their study that anxiety does effect the progression of atherosclerosis because anxiety has shown association with endothelial dysfunction in healthy elder males. The question remains that by what mechanism does anxiety affects endothelium or prognosis of atherosclerosis that leads to coronary heart disease?. Stress in patients with underlying CHD, causes vasomotor abnormalities in epicardial coronary arteries, abnormal production of catecholamine and defective haemostasis and thrombosis (Januzzi *et al.*, 2000).

The limitation of Rosenbloom *et al.* (2009) was that the study included the patients that have undergone CABG from 1 to 11 years before the enrolment, due to this there may be variance in the atherosclerosis of the graft and may have hidden the effect of anxiety on atherosclerosis.

Along with the association of anxiety with CHD, it has also influenced the outcome of cardiac surgery specially, CABG. Speziale, Ruvolo & Marino (1996) stated that patients show decrease in well being 12 months following CABG. Mallik *et al.* (2005) reported that worse

self perceived quality of life is higher in patients with depression as compared to those without it.

As far as gender difference is concerned, **Vanhout** *et al.*, (2004) reported that men have less capability of dealing with feelings of anxiety and they are more prone to have cardiovascular disease. Verbrugge (1985) stated that women can easily express their feelings and are quite open to accept help from others; therefore, they can cope up with the feelings of anxiety in better way. Mikhail (2006) reported that worst outcome after CABG is seen in case of women as compared to men, because of old age, small coronary arteries and presence of co-morbidity. Rymaszewska *et al.* (2003) reported in their study that the females in this study were old, living single and were unemployed and due to this reason they were more concerned an anxious regarding the recovery period following CABG. Thus, the result revealed that women were more anxious than men before the surgery and represents the gender difference. But, Timberlake (1997) put forward different idea that mood disturbances does not differ in men and women.

Szekely *et al.*, (2007) stated that increase rate of mortality and cardiovascular morbidity is associated with high level of trait anxiety by comparing the preoperative values with post, it was observed that post operative STAI-T scores can predict the cardiovascular events. In 4 years of follow up, it was observed that trait anxiety level was higher in patients that got admitted in the hospitalised due to congestive HF, arrhythmias, MI and angina (Szekely *et al.*, 2007). Haines, Imeson & Meade (1987) proved the relationship between anxiety and sudden cardiac death. In addition to it was observed after CABG that, the sense of well being declines (Speziale, Ruvolo & Marino, 1996). Yun *et al.*, (1999) suggested that even though improvements are observed in mental characteristics in 2 years post CABG but there is decrease in physical function 12 months after CABG. Szekely *et al.*, (2007) also reported that mortality and morbidity associated with length of ICU stay. Shemesh *et al.*, (2004)

described that posttraumatic stress disorder (PTSD) is caused by long stay in ICU, and after MI, PTSD can cause denial to medication in patients. Therefore, negative sense of well being and quality of life should be assessed before surgery and even during rehabilitation (Schelling *et al.*, 2003; Bapat *et al.*, 2005) as it always lowers the rate of hospitalisation following CABG (Scheier *et al.*, 1999). In most of the studies, the limitation was due to lack of large and homogenous populations and detail investigation of frequency of rehospitalisation.

It is observed that high level of anxiety is present 25% of the patients after successful heart revascularisation that results in lack of satisfaction with life, ignore the positive effect of the surgery and always complain about the health (Cay, 1992; Jodzio, 1996; Langeluddecke, 1989; Magni, 1987; McKhann, 1997; Pimm & Jude, 1990). Only surgery should not be blamed for these changes in the mood which occurs after the surgery because it also depends on the individual reaction of the patient to anxiety. One of the significant predictor of depression following CABG is trait anxiety (Timberlake, 1997) and even state anxiety can be predicted by trait anxiety (Vingerhoets, 1998). Rymaszewska *et al.* (2003) highly recommended the need of preoperative education in a comprehensive way as improper information, rumours heard from other patients can lead to more anxious situations. Systematic educational programs should be established that have positive therapeutic effect on patients (Mahler, Kulik & Tarazi, 1999).

5.2 In relation to research question 2, what are the effects of preoperative education on anxiety and CABG outcome?

Lie *et al.*, (2007) reported to be the first randomised control trial that had used home visits as a part of intervention. This study also observed that pre operative anxiety predicts the post operative symptoms, and has reported that patients with baseline anxiety can also

acquire benefit from home based programs and this supports the recommendation that the individual and supportive interventional program should be performed (Fridlund *et al.*, 1991; Moore & Kramer, 1996). Lie *et al.*, (2007) reported that 17% of the patients (n=185) were rehospitalized during the first 6 months after the surgery. But in another study, of 6 months follow up performed on CABG patients, it was reported that the 25% of the total population was rehospitalized (Scheier *et al.*, 1999). From this it becomes quite clear that health care costs may get reduced by providing home based programs as a part of intervention to the CABG patients. Further most, it is important to find out the impact of HBIP on large number of population that presents high level of anxiety prior to surgery.

Furze *et al.*, (2009) performed a study to find out the effect on post CABG outcome, when HeartOp program was added to normal nurse counselling provided to the patient. Furze *et al.*, (2005) & Maeland & Havik (1987) described that HeartOp program consists of booklet for the patient that explains some cardiac myths and misconceptions, method to decrease the risk for secondary prevention and what patient can expect during hospital and recovery phase. This program also provides an audio tape and CD for relaxation (Furze *et al.*, 2005; Maeland & Havik, 1987). The results were negative as this program does not improve the length of stay in hospital and also did not reduce the anxiety level (Furze *et al.*, 2005). On comparing this study with Arthur *et al.*, (2000) which presented the positive impact of the education, it is observed that the size of the sample was not large enough in the former study which may have given out latter study result. HeartOp program did not improve the anxiety level for the reason that the time of the surgery was very close and patients were flooded by fears, but have positive effect on depression (Watson *et al.*, 1995). CHD patients with misconceptions and fears are more prone to high anxiety and depression level along with limited physical functioning (Furze, Bull & Lewin, 2003; Maeland & Havik, 1987). These misconceptions also lead to undue anxiety which reduces the patient's capability to cope

with the outcomes (Leventhal, Benyamini & Brownlee, 1997). Furze *et al.*, (2009) therefore concluded that HeartOp program can be beneficial for the patients waiting for the surgery as it also cost effective. So far, over 800 coordinators were trained for this program especially in United Kingdom.

Shulldham *et al.*, (2002) performed a study in which the randomisation of the participants was beyond any doubt because of data analysis of the patients on entering the study excluding the length of wait for the surgery. Control group (n=168) had to wait for the surgery for longer time. But results have shown longer stay in hospital for experimental group (n= 188) which raises the question that what factors might have lead to longer stay of one group more than the other, was sickness present more in one group than the other?. Fast track health care was given to most of the patients in the control group as compared to interventional group but almost same number of patients from each group was taken to ICU. The study did not find any significance difference and this can be explained by the factors such as sample used for the research need to be large enough to make out the differences. Even though, there was ensured randomisation, still other determinants such as pause between education and the surgery is not manageable. On comparing with other studies that have presented a different result, the significant and non significant difference in this study is acceptable, because of the reason that the staff that was providing the intervention to the group were unaware of the distribution of the patients, but participants were aware about the group they are allocated to. Devine (1992) stated that positive effect of the education on surgical outcome is always seen where the education is provided by trained researcher, and it is quite unclear that whether education given by normal staff can bring generalised results. But Shulldham *et al.*, (2006) proved this question that the normal staff teaching is not sufficient to provide generalised findings.

In order to reduce Preoperative anxiety and to obtain better surgical outcome, it is important to provide patients with appropriate education (Lindeman & Aernam, 1971). Some studies proved the hypothesis that preoperative education to the patient reduces anxiety and bring better outcome after CABG, others, oppose it. Raleigh, Lepczyk & Rowley (1990) reported that there was no significant difference seen in anxiety levels between the patients who obtained preoperative information 1-7 days before the surgery and the patients who received the same information a night prior to surgery. Asilioglu & Celik (2004) also supports this study and concluded that there was no significant difference observed in level of anxiety between the control and the experimental group. These negative results might have occurred due to various reasons such as improper communication among the health care professionals, improper appearance of the patient's room or clinics or counselling a patient who had already undergone an operation. All these small but critical issues may have lead the studies end up with no significant difference.

Babaei *et al.*, (2007) stated that health education does improve the quality of life in terms of attitude and knowledge of the patient after CABG. A study in which the experimental group received a booklet 2 days prior to the surgery that informed the patients about the expected feeling after the surgery such as coughing, pain, and education regarding the heart and surgery, significance difference was reported by some patients who read the booklet within the group as they represented significant increase in the knowledge but no significant difference was seen between the two group (Christopherson & Pfeiffer, 1980). As far as effect of health education is concerned it is reported by Ahmadzadeh (2000) that anxiety was reduced in the experimental group that went through informative booklet prior to the surgery and there was significant difference noticed after CABG.

5.3 In relation to research question 3, what are the different ways of reducing anxiety in patients undergoing CABG?

Preadmission education and the timings of the education play an important role in reducing the patient's anxiety (Nelson, 1996; Mikulaninec, 1987). This education to the patient must be delivered within 24 hours before the patient gets discharged, but it is quite unclear that the education given on this time would be effective as the anxiety level will be high at this point of time (Beckie, 1989) which may deteriorate the desired effect of education given to the patient (Spielberger, 1995). Fredericks (2009) brought the time of delivery of education after CABG into light, by comparing patient education given at 1-2 days before discharge and 1-2 days after discharge from the hospital. But there was no significant difference seen between the participants of the study who were provided individualised education before the discharge, which indicates that it is not the timing that affects the outcome but is the quality of education that should make sense to the patients and must be delivered carefully. Same individualised education given to both the groups may lessen the influence of anxiety on the outcomes (Moore, 1996; Marshall, Penckofer & Llewellyn (1986). Burns & Grove (2003) stated that variation in anxiety scores may be due to the time at which the assessment was carried out because hospital stress in patients may result in increased level of anxiety. There is a need of behavioural interventions along with education as some patients might have knowledge but they lack motivation to cope up with the situations after CABG Fredericks (2009).

Bergmann *et al.*, (2001) compared the stress response in patients who received pamphlets along with the detailed oral information provided by a surgeon and patients who only got pamphlets. But there was no significant difference seen between two groups of patients. Even though the state anxiety level got reduced in both the groups after receiving medical information but this reduction was very less to be taken as clinically significant (Bergmann *et al.*, 2009). Anderson (1987) reported significant decrease in the state anxiety level and improved emotional status after providing the cardiac patients better and detailed

information and this positivity of the study was due to implication of different educational techniques such as counselling & modelling technique and sensory & procedural technique. Bergmann *et al.*, (2001) also stated that when patients were given anaesthesia the cortisol level was decreased and it returned to high normal figure 6 days after CABG. There was decrease in the state anxiety level six days following surgery but sense of well being was worst after the surgery (Bergmann *et al.*, 2001). Burker, Blumenthal & White (1995) pointed out the need to reduce anxiety before the surgery as it may predict the post operative depression.

Another form of intervention to reduce anxiety pre and post operatively in patients undergoing CABG is music therapy (Twiss *et al.*, 2006) as it is simple and cost effective tool available for the patients to manage anxiety. This therapy also provides a soothing effect by means of which patients becomes familiar in hospital settings (McCaffrey & Good, 2000). Apart from cardiac surgery, music therapy has shown positive results in reducing anxiety in patients admitted to the hospital with diagnosed MI and men undergoing prostate surgery (Guzzetta, 1989; Yung *et al.*, 2002). Twiss *et al.* (2002) also proved that provision of music also shortens the time of intubation. As compared to interrupted rest periods given to the patients post operatively, music intervention seems to be more effective in patients on ventilators (Wong, Lopez-Nahas & Molassiotis, (2001). Apart from the positive effect of the music therapy, there are some points that must be taken into consideration. Firstly, in patients undergoing CABG, other important physiological parameters must also be measured such as blood pressure, heart rate, medications such as analgesics and sedatives, and secondly when patients awakes from the surgery, he might be disorientated and confused (Holman *et al.*, 2001), these changes may cause increase in the risk of mortality, therefore further studies are required to find out the effect of music in such cases.

Information given on the form of video can enhance patient's sense of decision making (Liao *et al.*, 1996) as well as influence their diet and exercise (Mahler, Kulik & Tarazi, 1999) post CABG. A positive outcome after surgery mostly depends on the active participations of the patient, in asking questions to solve their doubts, discuss their treatment plan and feel emotionally supported (Cruz & Pincus, 2002; Stewart 1995). Patients who were given video education were emotionally strong and less anxious at the time of discharge; hence, the aim of the study that video information should stimulate patient's curiosity was achieved (Sorlie *et al.*, 2007). A higher capacity to handle different challenges to cope with different situations at their home were give to the intervention group for the long term effect of video education (Sorlie *et al.*, 2007), therefore, it may be beneficial to provide video intervention along the routine patient information.

50% of the mortality after the event of MI is due to lack of social support or less social interaction *Kawachi et al.*, (1996). *Peer support intervention program is based on the hypothesis that negative results from that occur due to disease or condition can be reduced by the support given by people who have gone through the same experience* (Parry *et al.*, 2009). Many patients with cancer have shown satisfaction from this program and have obtained beneficial effects (Campbell, Phaneuf & Deane, 2004).). So far, the effect of peer support program in cardiac population is reported by 6 studies that involved mainly younger men (mean age 55 years) and was undergoing CABG for the first time (Parry *et al.*, 2009). Home based peer support group intervention seems to be quite beneficial for the reasons that it can be provided on the telephone which makes advantageous for the people who live in distant places, and has positive effect on the health related quality of life and enhances recovery after CABG surgery (Parry *et al.*, 2009).

CHAPTER 6

CONCLUSION

6.0 CONCLUSION

The purpose of the study was to find out whether preoperative education reduces anxiety in patients undergoing coronary artery bypass surgery. This purpose of the study was broken down into three main research questions that were as follows:

1. Does anxiety causes CHD and poor CABG outcome?
2. What are the effects of preoperative education on anxiety and CABG outcome?
3. What are the different ways of reducing anxiety in patients undergoing CABG?

It becomes quite clear that anxiety is a strong predictor of the post operative psychological outcome and may lead to coronary heart disease or other cardiac event such as MI or even sudden cardiac death. All four studies represented that high anxiety level in the patients prior to CABG surgery may lead to worst post surgical complications. Assessment of the anxiety levels before the surgery makes possible to lower the rate of mortality. The point of concern is the time and scales used for the assessment of anxiety of the patients. It is quite obvious to feel anxious when surgery becomes the only remedy for the illness. But if, practical implementation of the advanced methods to control this war of the nerves are made it may help CABG patients to recover fast and develop a sense of well being and positivity about the life. It is also observed that better outcome also depends on patient's self efficacy to achieve the required goals. Along with the level of anxiety, patient's self efficacy must also be assessed to find out the capability of the patient to deal with particular situation.

There are mainly five studies that explained the second research question. Among these five studies, one study (Shuldham *et al.*, 2002) did not show any affect of preoperative education given to the patient on CABG outcome, rather, it reported that preoperative education led to longer stay in the hospital. This study did not proved that education does

not have positive effect but has analysed that education provided before the admission for the surgery have no effect. But four studies support the hypothesis and the main aim of this systematic review that preoperative education does bring positive effect on the CABG outcome. These studies have shown that provision of education can lower the score of anxiety and enhances the quality of life. Patients undergoing surgery like CABG may go through many misconceptions regarding health. HeartOp program seems beneficial as specialised education is given by a trained nurse by visiting patient's home and is quite advantageous for the patients waiting for their surgery. But the question arises that in case of emergency CABG, how does patients get benefit out of HeartOp program and if not what are the measures that are given to emergency CABG patients. Therefore, there is a need to perform a study to analyse the quality and duration of education given for patients going for emergency CABG because such patients go through same phase of psychological problems.

The other issue is what form of information shows more benefit. All five relevant studies have described the different forms of education provision to alleviate the anxiety levels. Out of these five, two studies have shown the negative results. First study stated that pamphlets along with oral information given by a surgeon is not sufficient to lessen the level of anxiety and second explained that specific individualised education does not bring better CABG outcome. Positive effect of music, information given in form of video and through peer support group have presented enhancement in recovery. It was observed that patients especially older patients who listen to music have less anxiety levels along with shorter duration of intubation. Peer group program in which the relevant information is given by the people who have undergone same phase of illness and surgery does have outstanding effect on other CABG patients and this method is quite feasible for the patients that live in distant areas which may be a restricting factor to access the service. In future, there is need of a study to find out the effect of education when it is given in to all elective CABG patients at

same time. This might help in sharing fears and doubts about the surgery with the fellow patients. But the point of concern is that instead of decreasing, it might increase the anxiety if the patient hears any false rumour about the surgery from the other patient. But the main aim of such a study would be to bring familiarity of the fears among the CABG patients and to encourage them to ask questions and clear their doubts.

Like advanced interventions are coming into action that mainly focus on the physiological issues of the health, psychological issues must be given same consideration as it also contributes to the post operative outcome. In UK, the cost of CABG is approximately £40,000, comparing this amount with the cost of psychological treatment, it is quite huge amount. The point is that the advancement in psychological treatments must not be left behind for cost effectiveness. It is concluded that, it is not only physiological but also psychological issues that can affect the outcomes of the surgery and should be managed in the same way as any other disease is cured.

7.0 REFERENCES FOR THE 14 RELEVANT STUDIES INCLUDED FOR THIS SYSTEMATIC REVIEW

Asilioglu K. & Celik S.S., (2004). The effect of preoperative education on anxiety of open cardiac surgery patients. ***Patient Education and Counselling***; 53, 65-70.

Babae G., keshavarz M., hidarnia a. & shayegan M., (2007). Effect of a health education program on quality of life in patients undergoing coronary artery bypass surgery. ***Acta Medica Iranica***, 45(1): 69-75.

Bergmann P., Huber S., Machler H., Liebl, E. Hinghofer-Szalkay H., Rehak P., & Rigler B., (2001). The Influence of Medical Information on the Perioperative Course of Stress in Cardiac Surgery Patients. ***A & A***; 93 (5), 1093-1099.

Fredericks S., (2009). Timing for delivering individualized patient education intervention to Coronary Artery Bypass Graft patients: An RCT. ***Eur J Cardiovasc Nurs***; 8(2):144-50.

Furze G., Dumville J.C., Miles J.N., Irvine K., Thompson D.R. & Lewin R.J., (2009). "Prehabilitation" prior to CABG surgery improves physical functioning and depression. ***Int J Cardiol***. 32(1):51-8.

Lie I., Arnesen H., Sandvik L., Hamilton G. & Bunch E.H., (2007). Effects of a home-based intervention program on anxiety and depression 6 months after coronary artery bypass grafting: a randomized controlled trial. ***J Psychosom Res***; 62(4):411-8.

Parry M.J., Watt-Watson J., Hodnett E., Tranmer J., Dennis C.L., Brooks D., (2009). Cardiac Home Education and Support Trial (CHEST): a pilot study. ***Can J Cardiol***; 25(12):e393-8.

Rosenbloom J.I., Wellenius G.A., Mukamal K.J. & Mittleman M .A., (2009). Self-reported anxiety and the risk of clinical events and atherosclerotic progression among patients with Coronary Artery Bypass Grafts (CABG). ***ESC Journal***. Volume 158, Issue 5, Pages 867-873.

Rymaszewska J., Kiejna A. & Hadrys T., (2003). Depression and anxiety in coronary artery bypass grafting patients. ***European Psychiatry***. 18(4), Pages 155-160.

Shulldham C. M., Fleming S., & Goodman H., (2002). The impact of pre-operative education on recovery following coronary artery bypass surgery. ***European Heart Journal***. 23, 666–674.

Sorlie T., Busund R., Sexton J., Sexton H. & Sorlie D., (2007). Video information combined with individualized information sessions: Effects upon emotional well-being following coronary artery bypass surgery--A randomized trial. ***Patient Educ Couns***. 65(2):180-8.

Szekely A., Balog P., Benko E., Breuer T., Szekely J., Kertai M.D., Horkay F., Kopp M.S. & Thayer J.F., (2007). Anxiety predicts mortality and morbidity after coronary artery and valve surgery--a 4-year follow-up study. ***Psychosom Med.*** 69(7):625-31.

Twiss E., Seaver J. & McCaffrey R., (2006). The effect of music listening on older adults undergoing cardiovascular surgery. ***Nursing in Critical Care***; 11, Issue 5, 224–231.

Vanhout H.P.J., Beekman A.T.F, **Beurs E.D, Comijs H., Marwijk, H.V., & Tilburg W.V., (2004).** Anxiety and the risk of death in older men and women. ***The British Journal of Psychiatry*** 185: 399-404.

7.1 MAIN REFERENCES

Abramov D., Tamariz M.G., Sever J.Y., Christakis G.T., Bhatnagar G., Heenan A.L., Goldman B.S. & Fremers S.E., (2000). The Influence of Gender on the Outcome of Coronary Artery Bypass Surgery. *The Society of Thoracic Surgeons*, 70:800-6.

Ahmadzadeh, M., (2000). ***The effect of health education on anxiety in CABG patients.*** A thesis submitted in partial fulfillment of the requirements for the degree of Master of Science (M.S) in health education. Iran, Tarbiat Modarres University, School of Medical Science.

Albert C.M., Chae C.U., Rexrode K.M., Manson J.E. & Kawachi I., (2005). Phobic Anxiety and Risk of Coronary Heart Disease and Sudden Cardiac Death Among Women. ***Circulation.*** **111:480-487.**

Allgulander C. & Lavori P. W., (1991). Excess mortality among 3302 patients with 'pure' anxiety neurosis. ***Archives of General Psychiatry***, 48, 599 -602.

Anderson E.A., (1987). Preoperative preparation for cardiac surgery facilitates recovery, reduces psychological distress, and reduces the incidence of acute postoperative hypertension. ***J Consult Clin Psychol***; 55: 513–20.

Armijo O. S., Macedo L.G., Gadotti I.C., Fuentes J., Staton T. & Magee D.J., (2008). Scales to assess the quality of randomised control trials; a systematic review. ***Physical therapy***, 88 (2), 156-175.

Arthur H.M., Daniels C., McKelvie R., Hirsh J., & Rush B., (2000). A Preoperative Program for Patients Awaiting Coronary Artery Bypass Graft (CABG) Surgery. ***Annals of Internal Medicine***, 133, 253-262. Retrieved from <http://www.annals.org/content/133/4/253.2.full>

Asilioglu K. & Celik S.S., (2004). The effect of preoperative education on anxiety of open cardiac surgery patients. ***Patient Education and Counseling***; 53, 65-70.

Askew G., Pearson K.W., Cryer D., (1990). Informed consent: can we educate patients? ***J R Coll Surg Edinb***. 35:308-310.

Babae G., Keshavarz m., Hidarnia a. & Shayegan m., (2007). Effect of a health education program on quality of life in patients undergoing coronary artery bypass surgery. ***Acta Medica Iranica***, 45(1): 69-75.

Bapat V., Allen D., Young C., Roxburgh J., Ibrahim M., (2005). Survival and quality of life after cardiac surgery complicated by prolonged intensive care. ***J Card Surg***; 20:212–7

Bateman T.M., Matloff J.M., Gray R.J., (1984). Myocardial infarction during coronary artery bypass surgery--benign event or prognostic omen? ***Int J Cardiol***. 6:259-263.

Bates T., (2001). Ethics of consent to surgical treatment. ***Br J Surg***. 88:1283-1284.

Beckie T., (1989). A supportive-educative telephone program: impact on knowledge and anxiety after coronary artery bypass graft surgery, ***Heart Lung*** 18, pp. 1–55.

Bergmann P., Huber S., Machler H., Liebl, E. Hinghofer-Szalkay H., Rehak P., & Rigler B., (2001). The Influence of Medical Information on the Perioperative Course of Stress in Cardiac Surgery Patients. ***A & A***; 93 (5), 1093-1099.

Bicer M., Ozdemir B., Iscimen R., Saba D., Yanar M., Tuydes O., Senkaya I. & Cengiz M., (2009). Postoperative Results of Off-Pump Coronary By-pass Grafting in Elderly Patients: A Single Center Experience. ***Open Cardiovasc Med J.***, 3: 15-20

Billman G.E., Schwartz P.J. & Stone H.L., (1982). Baroreceptor reflex control of heart rate: a predictor of sudden cardiac death. ***Circulation***; 66:874–880.

Blomberg S., Emanuelsson H., Kvist H., *et al.*, (1990). Effects of thoracic epidural anesthesia on coronary arteries and arterioles in patients with coronary artery disease. **Anesthesiology**, 73: 840-7.

Boker A., Brownell L. & Donen N., (2002). The amsterdam preoperative anxiety and information scale provides a simple and reliable measure of preoperative anxiety. **Can J Anaesth**. 49:792–798.

Booth-Kewley S. & Friedman H.S., (1987). Psychological predictors of heart disease: A quantitative review. **Psychological bulletin**, 101, 343-362.

Bradley K.M. & Williams DM., (1990). A comparison of the preoperative concerns of open-heart surgery patients and their significant others. **Cardiovasc Nurs**, 5:43-53.

Bruss J., Meyerowitz C., Greenspan A., Spielman S., (1992). The significance of the electrocardiogram after open heart surgery. In: Kotler M, Alfieri A, eds. **Cardiac and Noncardiac Complications of Open Heart Surgery: Prevention, Diagnosis, and Treatment**. Mt. Kisco, NY: Futura:39.

Braunwald E., (1998). Coronary artery bypass grafting. In: Braunwald E., (Ed.). **Heart Disease: A Textbook of Cardiovascular Medicine**. 5th ed. Philadelphia, Pa: WB Saunders Company; Chapter 52.

Brazier J.E., Harper R., Jones N.M.B., O'Cathain A., Thomas K.J., Usherwood T. & Westlake L., (1992). Validating the SF-36 Health Survey Questionnaire: new outcome measure for primary care. **British Medical Journal** ; 305:160-4.

Brunges M. & Avigne G., (2003). Music therapy for reducing surgical anxiety. **AORN Journal**; 78: 816–818.

Bunker T.D., (1983). An information leaflet for surgical patients. **Ann R Coll Surg Engl**. 65:242-243.

Burker E.J., Blumenthal J.A. & White W., (1995). Depression in male and female patients undergoing cardiac surgery. **Br J Clin Psychol**; 34: 119–28.

Burns N. & Grove S., (2003). **Understanding Nursing Research** (3rd ed), Saunders, Toronto

Campbell L.A., Kirkpatrick S.E., Berry C.C., *et al.*, (1992). Psychological preparation of mothers of preschool children undergoing cardiac catheterization. ***Psychol Health***. 7: 175–185.

Campbell H.S., Phaneuf M.R., Deane K., (2004). Cancer peer support programs-do they work!. ***Patient Educ Couns***; 55, 3-15.

Califf R.M., Harrell F.E. Jr., Lee KL, et al. The evolution of medical and surgical therapy for coronary artery disease. A 15-year perspective. ***JAMA***. 261:2077-2086.

Casale A. & Ulrich S., (1994). Complications in other organ systems. In: Baumgartner WS, Owens SG, Cameron DE, Baumgartner WA, eds. The Johns Hopkins Manual of Cardiac Surgical Care. St. Louis, Mo: ***CV Mosby***:271.

Cay E., (1992). The emotional state of patients after coronary bypass surgery. In: P.J Walter, Editor, ***Quality of life after open heart surgery***, Kluwer Academic Publishers, Dordrecht, pp. 177–185.

Centre for reviews and dissemination (CRD), (2009). Core principles and methods for conducting a systematic review of health interventions. ***Systematic reviews***. Chap 1, pp.33.

Christopherson B. & Pfeiffer C., (1980). Varying the timing of information to alter preoperative anxiety and postoperative recovery in cardiac surgery patients. ***Heart Lung***; 9(5):854-861.

Cinciripini P.M. (1986) Cognitive stress and cardiovascular reactivity. 1. Relationship to hypertension. ***American Heart Journal*** 11,1044 1050.

Cirone N., (1999). Cardiovascular disorder. ***Springhouse patient teaching***. Springhouse corporation.

Clark H.D., *et al.* (1999 Oct.). "Assessing the quality of randomized trials: reliability of the Jadad scale". ***Control Clinical Trials*** 20 (5)

Connerney I., Shapiro P.A., McLaughlin J.S., et al (2001). Relation between depression after coronary artery bypass surgery and 12-month outcome: a prospective study. ***Lancet*** 358:1766–1771.

Coryell W., Noyes R. & Clancy J., (1982) .Excess mortality in panic disorder. A comparison with primary unipolar depression. **Archives of General Psychiatry**, 39, 701 -703

Coryell W., (1988). Panic disorder and mortality. **Psychiatric Clinics of North America**, 11, 433 -404.

Cruz M. & Pincus H.A., (2002). Research on the influence that communication in psychiatric encounters has on treatment, **Psych Serv** ,53, pp. 1253–1265

Cupples S.A., (1991). Effects of timing and reinforcement of preoperative education on knowledge and recovery of patients having coronary artery bypass surgery. **Heart Lung**. 20:654-660.

Davidson K.W., Mostofsky E. & Whang W., (2010). Don't worry, be happy: positive affect and reduced 10-year incident coronary heart disease: The Canadian Nova Scotia Health Survey. **Eur Heart J** ; 31 (9): 1065-1070.

Dawes P.J. & Davison P., (1994). Informed consent: what do patients want to know? **J R Soc Med**. 87:149-152.

Dee R., (2003). “Who assisted whom?”. **Tex Heart Inst J** (Houston: Texas Heart Institute) 30 (1); 90. PMID 12368685.

DeFerrari G.M., Landolina M., Mantica M., Manfredini R., Schawartz P.J. & Lotto A., (1995). Baroreflex sensitivity, but not heart rate variability, is reduced in patients with life threatening ventricular arrhythmias long after myocardial infarction. **Am Heart J**. 130:473–480.

Detter C., Deuse T., Christ F., Boehm D.H., Reichenspurner H. & Reichart B., (2002). Comparison of two stabilizer concepts for off-pump coronary artery bypass grafting. **Ann Thorac Surg**. 74: 497–501.

Devine E.C. & Cook T.D., (1983). A meta-analytic analysis of effects of psychoeducational interventions on length of post-surgical hospital stay. **Nurs. Res**. **32** , pp. 267–274

Devine E.C., (1992). Effects of psychoeducational care for adult surgical patients: a meta-analysis of 191 studies. **Patient Educ Couns**; 19: 129–42.

Duits A.A., Boeke S., Taamms M.A., Passchier J., Erdman R.A.M., (1997). Prediction of quality of life after coronary artery bypass graft surgery: a review and evaluation of multiple, recent studies. ***Psychosom Med***, 59:257-268

Dupuy H.J., (1984). The Psychological General Well-Being (PGWB) index. In Wenger N.K., Mattson M.E., Furberg C.D. & Elinson J., (Ed.). ***Assessment of Quality of Life in Clinical Trials of Cardiovascular Therapies***, pp 170–183. New York: Le Jacq.

Eagle, K.A., Guyton R.A., Davidoff R. et al. (2004). "ACC/AHA 2004 guideline update for coronary artery bypasses graft surgery: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Committee to Update the 1999 Guidelines for Coronary Artery Bypass Graft Surgery)". ***Circulation*** 110 (14): e340–437.

Eaker E., Kronmal R., Kennedy W. & Davis K. (1989). Comparison of the long-term, postsurgical survival of women and men in the Coronary Artery Surgery Study (CASS). ***American Heart Journal*** 117, 7171.

Edelmann, R.J.,(1995). Preoperative anxiety and preparation for surgery. ***Anxiety Theory, Research and Intervention in clinical and health psychology***.

Eden O.B., (1990). Consenting patients [letter]. ***BMJ***. 301:1334.

Edwards F.H., Carey J.S., Grover F.L., Bero J.W. & Hartz R.S., (1998). Impact of Gender on Coronary Bypass Operative Mortality. ***Am Thorac Surg***, 66: 125-31.

Edwards F.H et al., (2005). Gender specific practice guidelines for coronary artery bypass surgery: preoperative management. *Annals of thoracic surgery* 79: 2189-2194.

Edwards M.H., (1990). Satisfying patients' needs for surgical information. ***Br J Surg***. 77:463-465.

Ehsan A., Shekar P. & Aranki S., (2004). Innovative surgical strategies: minimally invasive CABG and off-pump CABG. ***Curr Treat Options Cardiovasc Med***. 6: 43–51

Fahmy A., (2003). "Hamilton Anxiety Scale." Gale Encyclopedia of Mental Disorders. Retrieved on September 14, 2010 from (<http://www.encyclopedia.com/doc/1G2-3405700186.html>).

Fanning M.F., (2004). Reducing postoperative pulmonary complications in cardiac surgery patients with the use of the best evidence. *J Nurs Care Q.* 19:95-99.

Farrell T.G., Bashir Y., Cripps T.R., Malik M., Poloniecki J., Bennett E.D., Ward D., Camm A.J., (1997). Heart rate variability and sudden death secondary to coronary artery disease during ambulatory electrocardiographic monitoring. *Am J Cardiol.* 60:86–89.

Failde I. & Ramos I., (2000). Validity and reliability of the SF-36 Health Survey Questionnaire in patients with coronary artery disease. *J Clin Epidemiol*; **53(4):359-65.**

Fell D., Derbyshire D.R., Maile C.J., Larsson I.M., Ellis R., Achola K.J, et al., (1985) Measurement of plasma catecholamine concentrations. An assessment of anxiety. *Br J Anaesth.* 57:770–774.

Fredericks S., (2009). Timing for delivering individualized patient education intervention to Coronary Artery Bypass Graft patients: An RCT. *Eur J Cardiovasc Nurs.*; **8(2):144-50.**

Fridlund B., Hogstedt B., Lidell E. & Larsson P.A, (1991). Recovery after myocardial infarction. Effects of a caring rehabilitation programme, *Scand J Caring Sci* 5 (1991), pp. 23–32.

Furze G., Dumville J.C., Miles J.N., Irvine K., Thompson D.R. & Lewin R.J., (2009). "Prehabilitation" prior to CABG surgery improves physical functioning and depression. *Int J Cardiol.* 32(1):51-8.

Furze G., Lewin R., Murberg T.A., Bull P. & Thompson D., (2005). Does it matter what patients think? The relationship between changes in patients' beliefs about angina and their psychological and functional status. *J Psychosom Res.*; 59:323–329.

Furze G., Bull P. & Lewin R., (2003). Thompson D.R. Development of the York angina beliefs questionnaire. *J Health Psychol.* 8:307–316

Gattellari M., Butow P.N. & Tattersall M.H., (1999) Informed consent: what did the doctor say? *Lancet.* 353:1713. (

Geissler H.J, Hölzl P., Marohl S., Kuhn-Régnier F., Mehlhorn U., Südkamp M. & De Vivie E.R., (2000). Risk stratification in heart surgery: comparison of six score systems. *Eur J Cardio-thoracic Sur.* 17:400–406.

Gil K.M (1984). ***Coping effectively with invasive medical procedures: a descriptive model.***

Clin Psychol; 4:339–362. Retrieved from

<http://psy.psychiatryonline.org/cgi/content/full/39/1/30#R6Z225010>

Gordon T., Castelli W.P., Hjortland M.C., Kannel W.B. & Dawber T.R. (1977). Diabetes, blood lipids, and the role of obesity in coronary heart disease risk for women. The Framingham study. ***Annals of Internal Medicine*** 87, 393–397.

Gotze P., & Dahme B., (1980). ***Psychopathological syndromes and neurological disturbances before and after open-heart surgery, in Psychic and Neurological Dysfunctions After Open-Heart Surgery.*** In Speidel H, & Rodewald G (Ed.), New York, Thieme, pp. 48–66.

Gonzales E.A., Ledesma R.J., McAllister D.J., Perry S.M., Dyer C.A. & Maye J.P., (2010) Effects of guided imagery on postoperative outcomes in patients undergoing same-day surgical procedures: a randomized, single-blind study. ***AANA J.*** 78 (3):181-8.

Gummert J.F, Funkat A. & Krian A., (2005) Cardiac surgery in Germany during 2004: a report on behalf of the German society for thoracic and cardiovascular surgery. ***Thorac Cardiovasc Surg.***53:391–399.

Gustafson D.H., Hawkins R.P., Boberg E.W., McTavish F., Owens B., Wise M., et al., (2002). CHESS: 10 years of research and development in consumer health informatics for broad populations, including the underserved. ***Int J Med Inform;*** 65:169-77.

Guzzetta C., (1989). Effects of relaxation and music therapy on patients in a coronary care unit with presumptive acute myocardial infarction. ***Heart & Lung;*** 11: 609–616.

Haines A.P., Imeson T.D. & Meade T.W., (1987). Phobic anxiety and ischemic disease. ***BMJ*** ;295:297–9

Haller J.D. & Olearchyk A.S. (2002). "Cardiology's 10 greatest discoveries". ***Tex Heart Inst J*** (Houston: Texas Heart Institute) 29 (4): 342–4.PMID 12484626.

Halpin L.S., Speir A.M., CapoBianco P. & Barnett S.D., (2002). Guided imagery in cardiac surgery. ***Outcomes Manag.*** 6(3):132-7.

Hamilton M., (1959).The assessment of anxiety states by rating. ***Br J Med Psychol,*** 32:50–55.

Hannan E.L., Siu A.L., Kumar D., Kilburn H. Jr. & Chassin M.R., (1995). The decline in coronary artery bypass graft surgery mortality in New York State. ***The role of surgeon volume. JAMA.*** 273:209-213.

Hannan, EL., Wu C., Walford G. *et al.* (2008). "Drug-eluting stents vs. coronary-artery bypass grafting in multivessel coronary disease". ***N. Engl. J. Med.*** 358 (4): 331–41.

Haynes, R.B., Sackett D.L., Guyatt G.H. & Tugwell P. (2005). ***Clinical Epidemiology.*** Lippincott Williams & Wilkins. pp. 31.

Herrmann C., Brand-Driehorst S., Buss U., *et al* (2000). Effects of anxiety and depression on 5-year mortality in 5,057 patients referred for exercise testing. ***Journal of Psychosomatic Research,*** 48, 455 -462.

Hemmerling T.M., Prieto I., Choiniere J.L., Basile F. & Fortier J.D., (2004). Ultra-fast-track anesthesia in off-pump coronary artery bypass grafting: a prospective audit comparing opioid-based anesthesia vs thoracic epidural-based anesthesia. ***Can J Anaesth*** ; 51: 163-8

Herlitz J., Karlson B.W., Wiklund I. & Bengtson A., (1995). Prognosis and gender differences in chest pain patients discharged from an ED. ***American Journal of Emergency Medicine*** 13, 127 132.

Holman W., Allman R., Sansom M., Tellerman F. & Murray R., (2001). Alabama coronary artery bypass grafting project: results of a statewide quality improvement initiative. ***JAMA;*** 285: 3003–3010.

Hopper K.D., TenHave T.R., Hartzel J., (1995). Informed consent forms for clinical and research imaging procedures: how much do patients understand?. ***AJR Am J Roentgenol;*** 164:493-496.

Hopper K.D., TenHave T.R., Tully D.A. & Hall TE. (1998). The readability of currently used surgical/procedure consent forms in the United States. ***Surgery;***123:496-503.

Institute of Medicine., (2004). ***Health literacy: a prescription to end confusion.*** Washington DC: National Academies Press.

Jadad A.R., Moore R.A., Carroll D., Jenkinson C., Reynolds D.J.M., Gavaghan D.J. & McQuay H.J., (1996). "Assessing the quality of reports of randomized clinical trials: Is blinding necessary?". **Controlled Clinical Trials** ; 17 (1): 1–12.

Januzzi Jr J.L., Stern T.A. & Pasternak R.C. *et al.*, (2000). The influence of anxiety and depression on outcomes of patients with coronary artery disease, *Arch Intern Med* **160**, pp. 1913–1921

Jelicic M., & Bonke B., (1991). Preoperative anxiety and motives for surgery. **Psychol Rep** 68:849–850.

Jenkins C.D., (1976). Recent evidence supporting psychologic and social risk factors of coronary disease. **New England journal of medicine**, 294, 1033-1038.

Jenkins C.D., (1983). Psychosocial and behavioural factors. In N.M. Kaplan & J. Stamler (Eds.), **Prevention of coronary heart disease: practical management of the risk factors**. Philadelphia, PA: Saunders

Jensen B.O., Hughes P., Rasmussen L.S. Pedersen P.U. & Steinbrüchel D.A., (2006). Health-related quality of life following off-pump versus on-pump coronary artery bypass grafting in elderly moderate to high-risk patients: a randomized trial. **Eur J Cardiothorac Surg** ;**30**:294-29.

Jodzio K., (1996). Psychosocial problems of patients after surgical treatment of coronary artery disease. **Sztuka Leczenia** **2** (1996), pp. 41–46.

Johnsson F. E., Ojehagen A. & Traskman-Bendz L., (1996). A 5-year follow-up study of suicide attempts. **Acta Psychiatrica Scandinavica**, 93, 151 -157.

Johansson K., Nuutila L., Virtanen H., Katajisto J. & Salanterae S., (2005). Preoperative education for orthopaedic patients: systematic review. **J Adv Nurs**; 50:212-23.

Joukamaa M., (1992). **Crown-Crisp Experiential Index, a useful tool for measuring neurotic psychopathology**. Vol. 46, No. 1, Pages 49-53.

Joukamaa M., Heliövaara M., Knekt P., *et al* (2001). Mental disorders and cause-specific mortality. **British Journal of Psychiatry**, 179, 498 -502.

Julian D.G., Camm A.J., Fox K.M. & Hall R.J.C. (1989). Diseases of the heart. ***In The Mind and the Heart*** (Freeman L.J. ed.), Bailliere Tindall, London, pp. 1500–1509.

Kain, Z., Mayes, L.C., O'Connor, T.Z., & Cicchetti, D.V. (1996). Preoperative anxiety in children: Predictors and outcomes. ***Archives of Paediatrics & Adolescent Medicine***, 150, 1238-1245.

Kane R.L., Wang J. & Garrard J., (2007). Reporting in randomised clinical trials improved after the adoption of the CONSORT statement. ***Journal of clinical Epidemiology***; 60, 241-249.

Kapnoullas J., (1988). Nursing interventions for the relief of preoperative anxiety. ***Austr J Adv Nursing*** ;5:8-15.

Kawachi I., Colditz G. A., Ascherio A., Rimm E. B, Giovannucci E., Stampfer M. J. & Willett W. C., (1994). Coronary Heart Disease/Myocardial Infarction: Prospective Study of Phobic Anxiety and Risk of Coronary Heart Disease in Men. ***Circulation***. 89(5).

Kawachi I., Sparrow D., Vokonas P.S. & Weiss S.T., (1995). Decreased heart rate variability in men with phobic anxiety (data from the Normative Aging Study). ***Am J Cardiol***. 75:882– 885.

Kawachi I., Colditz G. A., Ascherio A. et al., (1996). A prospective study of social networks in relation to total mortality and cardiovascular disease in men in the USA. ***J Epidemiol Community Health***; 50, 245-51.

Kellerman P., (1994). Perioperative care of the renal patient. ***Arch Intern Med***. 154:1674.

Kessler P., Aybek T., Neidhart G., et al., (2005). Comparison of three anaesthetic techniques for off-pump coronary artery bypass grafting: general anaesthesia, combined general and high thoracic epidural anaesthesia, or high thoracic epidural anaesthesia alone. ***J Cardiothorac Vasc Anesth***,19: 32-9.

King S.B 3rd, Lembo NJ, Weintraub WS, et al., (1994). A randomized trial comparing coronary angioplasty with coronary bypass surgery. Emory Angioplasty versus Surgery Trial (EAST). ***N Engl J Med***. 331:1044-1050.

Kirklin J.W., Naftel C.D. & Blackstone E.H., et al., (1989). Summary of a consensus concerning death and ischemic events after coronary artery bypass grafting. ***Circulation***; 79(6 Pt 2):181-91.

Khan S., Nessim S., Gray R. *et al.* (1990). Increased mortality of women in coronary artery bypass surgery: evidence for referral bias. ***Annals of Internal Medicine***, 112, 561-567.

Kobak K.A., Reynolds W.M. & Greist J.H (1993). Computerized and clinician assessment of depression and anxiety: Respondent evaluation and satisfaction. ***Journal of Personality Assessment***, 63, 173-180.

Kobrin S., & Tobias S., (1992). Renal complications of open heart surgery. In: Kotler M, Alfieri A, eds. ***Cardiac and Noncardiac Complications of Open Heart Surgery: Prevention, Diagnosis, and Treatment***. Mt. Kisco, NY: Futura; 311.

Koivula M., Paunonen-Ilomen M., Tarkka M.-T., Tarkka M., Laippala P., (2001). Fear and anxiety in patients awaiting coronary artery bypass grafting. ***Heart Lung***. 2001;**30**:302–311

Koivula M., Hautamäki-Lamminen K. & Astedt-Kurki P., (2010). Predictors of fear and anxiety nine years after coronary artery bypass grafting. ***Journal of Advanced Nursing*** 66, Issue 3, pages 595–606.

Kolessov VI (1967). Mammary artery-coronary artery anastomosis as method of treatment for angina pectoris. ***J Thorac Cardiovasc Surg*** 54:535–44. [PubMed]

Kubzansky L.D., Kawachi I., Weiss S.T., & Sparrow D., (1998). Anxiety and coronary heart disease: A synthesis of epidemiological, physiological, and experimental evidence. ***Ann Behav Med*** 20:47-58.

Kurki T.S., Kataja M. & Reich D.L., (2003). Emergency and elective coronary artery bypass grafting: comparisons of risk profiles, postoperative outcomes, and resource requirements. ***Cardiothorac Vasc Anesth*** ;17(5):594-7.

Lamarche D., Taddeo R. & Pepler C., (1998). The preparation of patients for cardiac surgery. ***Clin Nurs Res***. 7:390-405

Lane D., Carroll D., Ring C., Beevers D.G. & Lip G.Y.H., (2000). Do depression and anxiety predict recurrent coronary events 12 months after myocardial infarction?.

QJM ;93 (11): 739-744.

Langeluddecke L.M., (1989). A prospective evaluation of the psychological effects of coronary artery bypass surgery. **J Psychosom Res** 33, pp. 37–45

Lavie S.J., & Milani R.V., (2004). Prevalence of anxiety in coronary patients with improvement following cardiac rehabilitation and exercise training. **Am J Cardiol.** 93:336–339. doi: 10.1016/j.amjcard.2003.10.015

Legendre A., Chantepie A., Belli E., Vouhé P.R., Neville P., Dulac Y., Vaksman G., Bonnet D, S., (2010). **Outcome of coronary artery bypass grafting performed in young children**, retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/19775706>.

Leventhal H., Benyamini Y. & Brownlee S., (1997). **Illness representations: theoretical foundations**. In: Petrie K.J., Weinman J.A., editors. Perceptions of health and illness. Harwood Academic Publishers; Amsterdam: pp. 19–45.

Lewandowski W., Good M. & Draucker C.B., (2005). Changes in the Meaning of Pain with the Use of Guided Imagery. **Pain Manag Nurs.** 6(2):58-67.

Lewis P.J., O'Keefe L. & Adcock S., (1991). Patients who were given information sheets have better postoperative recall of information [letter]. **J R Coll Surg Edinb.** 36:206-207

Liao L., Jollis J.G., DeLong E.R., Peterson E.D., Morris K.G. & Mark D.b., (1996). Impact of an interactive video on decision making of patients with ischemic heart disease. **J Gen Med**, pp. 373–378.

Lie I., Arnesen H., Sandvik L., Hamilton G. & Bunch E.H., (2007). Effects of a home-based intervention program on anxiety and depression 6 months after coronary artery bypass grafting: a randomized controlled trial. **J Psychosom Res**; 62(4):411-8.

Lindeman C.A. & Aernam B.V., (1971). Nursing intervention with the presurgical patient: the effects of structured and unstructured preoperative teaching. **Nurs. Res.** 20 (1971), pp. 319–332.

Lloyd A.J., Hayes P.D., London N.J.M., Bell P.R.F. & Naylor A.R., (1999). Patients' ability to recall risk associated with treatment options. **Lancet.** 353:645.

Lown B., Verrier R.L. & Corbalan R., (1973). Psychologic stress and threshold for repetitive ventricular response. ***Science***. 182:834–836.

Lynöe N., Sandlund M., Dahlqvist G. & Jacobsson L., (1991). Informed consent: study of quality of information given to participants in a clinical trial. ***BMJ***; 303:610-613.

Maeland J.G. & Havik O.E., (1987). Measuring cardiac health knowledge. ***Scand J Caring Sci***; 7:23–31

Mahler H.I., Kulik J.A. & Tarazi R.Y, (1999). Effects of a videotape information intervention at discharge on diet and exercise compliance after coronary bypass surgery. *J Cardiopulm Rehabil* **19**, pp. 170–177.

Maier W., Buller R., Philipp M. & Heuser I., (1988). The Hamilton Anxiety Scale: reliability, validity and sensitivity to change in anxiety and depressive disorders. ***J Affect Disord***, **14(1):61-8.**

Magni G., (1987). Psychosocial outcome one year after heart surgery: a prospective study. ***Arch Intern M*** 147, pp. 473–477.

Mathesin L. Et al., (2005). Patient reported outcome after randomisation to on-pump verses off-pump coronary artery surgery. ***Annals of thoracic Surgery*** 79: 1584-1589.

Mallik S., Krumholz H.M., Lin Z.Q., Kasl S.V., Mattera J.A., Roumanis S.A. & Vaccarino V., (2005). Patients with depressive symptoms have lower health status benefits after coronary artery bypass surgery. ***Circulation***; 111:271–7

Maranets I. & Kain Z.N., (1999). Preoperative anxiety and intraoperative anesthetic requirements. ***Anesth Analg***. 89:1346–1351.

Marshall J., Penckofer S. & Llewellyn J., (1986). Structured post-operative teaching and knowledge and compliance of patients who had coronary artery bypass surgery, ***Heart Lung*** **15**, pp. 76–82

McCann, M.E., & Kain, Z. (2001). The management of preoperative anxiety in children: An update. ***Anaesthesia and Analgesia***, 93, 98-105.

McCaffrey R. & Good M. (2000). The lived experience of listening to music while recovering from surgery. ***Journal of Holistic Nursing***; 378–390.

McCormack D., Evoy D., Mulcahy D., & Walsh M., (1997). An evaluation of patients comprehension of orthopaedic terminology: implications for informed consent. *J R Coll Surg Edinb*;42:33-35.

McKhann G.M., (1997). Depression and cognitive decline after artery bypass grafting. *Lancet* **49**, pp. 1282–1284.

Migneault B., Girard F., Albert C., Chouinard P., Boudreault D., Provencher D., Todorov A., Ruel M. & Girard D.C., (2003). The effect of music on the neurohormonal stress response to surgery under general anesthesia. *Anesthesia & Analgesia*; 98: 527–532.

Mikhail G.W., (2006). Coronary revascularisation in women. *Heart*; 92 Suppl 3: iii19-23.

Mikulaninec C.E, (1987). Effects of mailed preoperative instructions on learning and anxiety. *Pat. Educ. Couns.* **10**, pp. 253–265.

Miracle V.A. & Hovekamp G., (1994). Needs of families of patients undergoing invasive cardiac procedures. *Am J Cfit Care* ;3:155-7.

Mindgarden Inc. (2008). *State-Trait Anxiety Inventory for Adults*, retrieved from (<http://www.mindgarden.com/products/staisad.htm>)

Moerman N., Van Dam F.S., Muller M.J. & Oosting H., (1996). The amsterdam preoperative anxiety and information scale (APAIS). *Anesth Analg.* 82:445–451.

Moore S.M. & Kramer F.M., (1996). Women's and men's preferences for cardiac rehabilitation program features, *J Cardiopulm Rehabil* **16**, pp. 163–168.

Moore S., (1996). A comparison of women's and men's symptoms during home recovery after coronary artery bypass surgery, *Heart Lung*, pp. 495–501.

Moher D., Schulz K.F., & Altman D.G., (2001). The consort statement; revised recommendations for improving the quality of reports of parallel group randomised trials. *Lancet*, 357, 1191-1194.

Moher D., Hopewell S., Schulz K.F., Montori V., Gotzsche P.C., Devereaux P.J., Elbourne D., Egger M. & Altman D.G., (2010). "CONSORT 2010 explanation and elaboration: updated guidelines for reporting parallel group randomised trials". *Br Med J*, 340: c869.

Moras K., Di Nardo P.A., Barlow D.H., (1992). Distinguishing anxiety and depression: Re-examination of the Reconstructed Hamilton Scales. ***Psychological Assessment***, 4, 224-227.

Musselman D.L., Evans D.L., Nemeroff C.B., (1998). The relationship of depression to cardiovascular disease. ***Arch Gen Psychiatry*** 55:580-592

Narita K., Murata T. & Hamada T. *et al.*, (2007). Association between trait anxiety and endothelial function observed in elderly males but not in young males, ***Int Psychogeriatr*** 19, pp. 947–954

National task force on training family physicians in Patient education (1979). ***Patient education: a handbook for teachers***. Kansas City, MO: The society of teachers of family medicine.

Nelson S., (1996). Pre-admission education for patients undergoing cardiac surgery. ***Br. J. Nurs.*** 5, pp. 335–340

Noiseux N., Prieto I., Bracco D., Basile F. & Hemmerling T., (2008). Coronary Artery Bypass Grafting in the Awake Patient Combining High Thoracic Epidural and Femoral Nerve Block: First Series of 15 Patients. ***British Journal of Anaesthesia***, 100(2):184-189.

Ohki, S., Kaneko T., Satoh Y. *et al.* (2002). "[Coronary artery bypass grafting in octogenarian]" (in Japanese). ***Kyobu geka. the Japanese journal of thoracic surgery*** 55 (10): 829–33; discussion 833–6. PMID 12233100.

Olivo S.A., Macedo L.G., Gadotti I.C., Fuentes J., Stanton T. & Magee D.J., (2008). "Scales to Assess the Quality of Randomized Controlled Trials : A Systematic Review". ***Physical therapy***, 88 (2).

Osborn T.M. & Sandler N.A., (2004). The effects of preoperative anxiety on intravenous sedation. ***Anesth Prog.*** 2004;51:46–51.

Parks R., (2008). *Angioplasty versus coronary artery bypass graft (CABG) surgery*. Retrieved from <http://www.revolutionhealth.com/conditions/heart/coronary-artery-disease/surgery/bypass-graft>.

Parry MJ, Watt-Watson J, Hodnett E, Tranmer J, Dennis CL, Brooks D., (2009). Cardiac Home Education and Support Trial (CHEST): a pilot study. ***Can J Cardiol***; 25(12):e393-8.

Penninx B. W., Geerlings S. W., Deeg D. J., *et al.*, (1999). Minor and major depression and the risk of death in older persons. ***Archives of General Psychiatry***, 56, 889 -895

Pignay-Demaria V., Lespérance F., Demaria R.G., Frasure-Smith N. & Perrault L.P., (2003). Depression and anxiety and outcomes of coronary artery bypass surgery. ***Ann Thorac Surg***. 75:314–321. doi: 10.1016/S0003-4975(02)04391-6.

Pimm J.B. & Jude V, (1990). Beck depression inventory scores of coronary patients with or without psychological interventions. In: A.E Willner and G Rodewald, Editors, ***Impact of cardiac surgery on the quality of life***, Plenum Press, New York.

Pirraglia P.A., Peterson J.C., Williams-Russo P., Gorkin L., Charlson M.E., (1999). Depressive symptomatology in coronary artery bypass graft surgery patients. ***Int J Geriatr Psychiatry*** 14:668-680.

Radloff L.S., (1977). The CES-D Scale, ***A Self-Report Depression Scale for Research in the General Population***. *Applied Psychological Measurement*, 1, pp. 3 385-401

Rankin S.H., & Stallings K.D., (1996). Roundtable problems encountered in practice settings. ***Patient education***, (3rd Ed.) pp 321-322.

Raleigh E.H., Lepczyk M. & Rowley C., (1990). Significant others benefit from preoperative information. ***J. Adv. Nurs***. 15, pp. 941–945.

Rich M.W., Saini J., Kleiger R.E., Carney R.M., TeVelde A. & Freedland K.E., (1988). Correlation of heart rate variability with clinical and angiographic variables and late mortality after coronary angiography. ***Am J Cardiol***. 62:59–66.

Richman L.S., Kubzansky L., Maselko J., Kawachi I. & Choo P., (2005). Bauer M. Positive emotion and health: going beyond the negative. ***Health Psychol***;24:422-429.

Rosen J.B. & Schulkin J., (1998). "From normal fear to pathological anxiety". *Psychol Rev* 105 (2): 325–50. doi:10.1037/0033-295X.105.2.325. PMID 9577241

Rosenbloom J.I., Wellenius G.A., Mukamal K.J. & Mittleman M .A., (2009). Self-reported anxiety and the risk of clinical events and atherosclerotic progression among patients with Coronary Artery Bypass Grafts (CABG). *ESC Journal* . Volume 158, Issue 5, Pages 867-873.

Rothrock J.C., (2007). Cardiac surgery. *Alexander's Care of the patient in surgery* (13th Ed.).

Royse C., Royse A., Soeding P, Blake d. & Pang J., (2003). Prospective randomized trial of high thoracic epidural analgesia for coronary artery bypass surgery. *Ann Thorac Surg* ;75:93-100.

Rozanski A., Blumenthal J.A., Kaplan J., (1999). Impact of psychological factor on the pathogenesis of cardiovascular disease and implications for therapy. *Circulation* 99:2192-2217.

Rule W.R. & Traver M.D., (1983). Test-Retest Reliabilities of State-Trait Anxiety Inventory in a Stressful Social Analogue Situation. *Journal of Personality Assessment*. 47,3);276-277.

Salmon, P., (2000). Psychological impact of physical illness. *Psychology of Medicine and Surgery*.

Rymaszewska J., Kiejna A. & Hadrys T., (2003). Depression and anxiety in coronary artery bypass grafting patients. *European Psychiatry*. 18(4), Pages 155-160

Sanwal A.K., Kumar S., Sahni P. & Nundy S., (1996). Informed consent in Indian patients. *J R Soc Med*. 89:196-198.

Schelling G., Richter M., Roozendaal B., Rothenhausler H.B., Krauseneck T., Stoll C., Nollert G., Schmidt M. & Kapfhammer H.P., (2003). Exposure to high stress in the intensive care unit may have negative effects on health-related quality-of-life outcomes after cardiac surgery. *Crit Care Med*; 31:1971–80.

Schachner T., Zimmer A., Nagele G., Laufer G., & Bonatti J., (2005). Risk factors for late stroke after coronary artery bypass grafting. *J Thorac Cardiovasc Surg*. 130: 485–490.

Scheier M.F., Matthews K.A., Owens J.F., Schulz R., Bridges M.W. & Magovern G.J. *et al.*, (1999). Optimism and rehospitalization after coronary artery bypass graft surgery, *Arch Intern Med* 159 , pp. 829–835.

Scheier M.F., Matthews K.A., Owens J.F., Schulz R., Bridges M.W., Magovern G.J. & Carver C.S., (1999). Optimism and rehospitalization after coronary artery bypass graft surgery. **Arch Intern Med**; 159:829–35

Schindele S., Renggli P. & Hackenbruch W., (2001). Patient education before orthopedic elective interventions: “the Langenthal model of 3-step patient education” [in German]. **Swiss Surg**. 7:151-157.

Scott N.B., Turfrey D.J., Ray D.A., *et al.*, (2001). A prospective randomized study of the potential benefits of thoracic epidural anesthesia and analgesia in patients undergoing coronary artery bypass grafting. **Anesth Analg** ; 93: 528-35

Seshadri N., Whitlow P.L., Acharya N., Houghtaling P., Blackstone E.H. & Ellis S.G., (2002). Emergency Coronary Artery Bypass Surgery in the Contemporary Percutaneous Coronary Intervention Era. **Circulation**;106:2346.

Shekar P.S., (2006). On-Pump and Off-Pump Coronary Artery Bypass Grafting. **Circulation**. ;113:e51-e52.

Shemesh E., Yehuda R., Milo O., Dinur I., Rudnick A., Vered Z. & Cotter G., (2004). Posttraumatic stress, nonadherence, and adverse outcome in survivors of a myocardial infarction. **Psychosom Med**; 66:521–6

Shen B.J., Avivi Y.E., Todaro J.F., Spiro A., Laurenceau J.P., Ward K.D. & Niaura R., (2008). Anxiety characteristics independently and prospectively predict myocardial infarction in men the unique contribution of anxiety among psychologic factors. **Am Coll Cardiol**; 51(2):113-9.

Shepherd H.A., Bowman D., Hancock B., Anglin J. & Hewett D., (2000). Postal consent for upper gastrointestinal endoscopy. **Gut**. 46:37-39.

Shibeshi W.A., Young-Xu Y., & Blatt C.M., (2007). Anxiety Worsens Prognosis in Patients With Coronary Artery Disease. **Am Coll Cardiol**, 49:2021-2027

Shroyer A.L., Grover F.L., Hattler B., Collins J.F., McDonald G.O., M.D., Kozora E., Lucke J.C., Baltz J.H., & Novitzky D., (2009). On-Pump versus Off-Pump Coronary-Artery Bypass Surgery. **N Engl J Med**, 361:1827-1837.

Shukla V.K., Bai Annie, Milne G. & Wells S., (2007). **Systematic Review of Quality Assessment Instruments for Randomized Control Trials**: Selection of SIGN50 Methodological Checklist . 15th Cochrane Colloquium, Sao Paulo.

Shuldham C.M., (2001). Pre-operative education for the patient having coronary artery bypass surgery. **Patient Educ Couns**; 43(2):129-37.

Shuldham C. M., Fleming S., & Goodman H., (2002). The impact of pre-operative education on recovery following coronary artery bypass surgery. **European Heart Journal**. 23, 666–674.

Sibbald B. & Roland M., (1998). Understanding control trials: why are randomised control trials important? **British Medical Journal**; 316, 201.

Smith, M. (2008). **Anxiety attacks and disorders: Guide to the signs, symptoms, and treatment options**. Retrieved from http://www.helpguide.org/mental/anxiety_types_symptoms_treatment.htm

Smith N.F., & Lesperance F., (2008). Depression and anxiety as predictors of 2-year cardiac events in patients with stable coronary artery disease, **Arch Gen Psychiatry** 65, pp. 62–71

Sorlie T., Busund R., Sexton J., Sexton H. & Sorlie D., (2007). Video information combined with individualized information sessions: Effects upon emotional well-being following coronary artery bypass surgery--A randomized trial. **Patient Educ Couns**. 65(2):180-8.

Speziale G, Ruvolo G, & Marino B., (1996). Quality of life following coronary bypass surgery. **J Cardiovasc Surg** (Torino);37:75–8

Spielberger, C. D., Gorsuch, R.L., & Lushene. R.E. (1970). **Manual for the State-Trait Anxiety Inventory**. Palo Alto, CA: Consulting Psychologists Press

Spielberger, C.D., (1972). Anxiety as an emotional state. In C.D Spielberger (Ed.), **Anxiety: current trends in theory and research**, Vol 1. New York: Academic press.

Spielberger, C. D., Reheiser, E.C., Ritterband, L.M., Sydeman, S.J., & Unger, K.K., (1995). Assessment of Emotional States and Personality Traits: Measuring Psychological Vital Signs. In Butcher, J.N. (Ed.) **Clinical Personality Assessment: Practical Approaches**. New York: Oxford University Press.

Spielberger C.D., (1995). ***Test Anxiety: Theory, Assessment, and Treatment***, Taylor & Francis, Washington, D. C.

Squires, V.L. (1995). Child-focused preoperative education: Helping children understand and cope with surgery. ***Seminars in Preoperative Nursing***, 4(2), 80-87

Stenchever M.A., (1991). Too much informed consent? [editorial]. ***Obstet Gynecol.*** 77:631.

Stengrevics S., Sirois C., Schwartz C.E., et al. (1996). The prediction of cardiac surgery outcome based upon preoperative psychological factors. ***Psychol Health***; 11:471–477

Stewart J.C., Janicki D.L & Muldoon M.F *et al.*, (2007). Negative emotions and 3-year progression of subclinical atherosclerosis, ***Arch Gen Psychiatry*** 64 (2007), pp. 225–233.

Stewart M.A., (1995). Effective physician–patient communication and health outcomes: a review, ***Can Med Assoc J*** 152, pp. 1423–1433.

Sun G.C., Hsu M.C., Chia Y.Y., Chen P.Y. & Shaw F.Z., (2008). Effects of age and gender on intravenous midazolam premedication: a randomized double-blind study. ***Br J Anaesth.*** 101:632–639.

Szekely A., Balog P., Benko E., Breuer T., Szekely J., Kertai M.D., Horkay F., Kopp M.S. & Thayer J.F., (2007). Anxiety predicts mortality and morbidity after coronary artery and valve surgery--a 4-year follow-up study. ***Psychosom Med.*** 69(7):625-31.

Taggart D.P., (2005). Surgery is the best intervention for severe coronary artery disease. ***BMJ.*** 330(7494):785-6.

Thoralf M., (2010). ***New Study Shows Superiority of CABG over Drug Eluting Stents***, retrieved from <http://www.sts.org/sections/patientinformation/adultcardiacsurgery/cabg/>

Timberlake N., (1997). Incidence and patterns of depression following coronary artery bypass surgery. ***J Psychosom Res*** 2, pp. 197–207

Tomkins S.S., (1963). Affect Imagery Consciousness: ***The Positive Affects***. New York, NY: Springer Publishing Inc.

Tully P.J, Baker R.A., Knight J.L., (2008). Anxiety and depression as risk factors for mortality after coronary artery bypass surgery. ***J Psychosom Res***, 64, Issue 3, 285-290

Twiss E., Seaver J. & McCaffrey R., (2006). The effect of music listening on older adults undergoing cardiovascular surgery. *Nursing in Critical Care*; 11, Issue 5, 224–231.

Underwood M.J., Firmin R.K., & Jehu D., (1993). Aspects of psychological and social morbidity in patients awaiting coronary artery bypass grafting. *Br Heart J.* **69**:382–384

Utriya Prasit K., Moore S.M. & Chaiseri P., (2010). Recovery after coronary artery bypass surgery: effect of an audiotape information programme. *Journal of Advanced Nursing* 66(8), 1747–1759.

Vanhout H.P.J., Beekman A.T.F., Beurs E.D, Comijs H., Marwijk, H.V., & Tilburg W.V., (2004). Anxiety and the risk of death in older men and women. *The British Journal of Psychiatry* **185: 399-404**

Vanoli E., DeFerrari G.M., Stramba-Badiale M., Hull S.S., Foreman R.D. & Schwartz P.J., (1991). Vagal stimulation and prevention of sudden death in conscious death with a healed myocardial infarction. *Circ Res.* 68:1471–1481.

Verbrugge, L. M. (1985) Gender and health – an update on hypotheses and evidence. *Journal of Health and Social Behaviour*, 26, 156 -182

Vingerhoets G., (1998). Perioperative anxiety and depression in open-heart surgery. *Psychosomatics* **39**, pp. 30–37.

Watson D., Clark L.A., Weber K., Assenheimer J.S., Strauss M.E. & McCormick R.A., (1995). Testing a tripartite model: II. Exploring the symptom structure of anxiety and depression in student, adult and patient samples. *J Abnorm Psychol*; 104:15–25.

Ward C.R., Constancia P.E. & Kern L., (1990). Nursing interventions for families of cardiac surgery patients. *J Cardiovasc Nurs* 5(1):34-42.

Ware J.E, Snow K.K., Kosinski M., Gandek B., (1993). *SF-36 Health Survey Manual and Interpretation Guide*. Boston, MA: New England Medical Center, The Health Institute.

Ware J.E., (1995). The status of health assessment 1994. *Annu Rev Public Health*; 16:327-54.

Warshaw M. G., Dolan R. T. & Keller M. B., (2000). Suicidal behaviour in patients with current or past panic disorder: five years of prospective data from the Harvard/Brown Anxiety Research Program. ***American Journal of Psychiatry***, 157, 1876 -1878.

Weissman C., (1990). The metabolic response to stress: an overview and update. ***Anesthesiology***. 73:308–327.

Weissman M. M., Markowitz J. S., Ouellette R., *et al* (1990). Panic disorder and cardiovascular/cerebrovascular problems: results from a community survey. ***American Journal of Psychiatry***, 147, 1504 -1508

Wong H., Lopez-Nahas V. & Molassiotis A. (2001). Effects of music therapy on anxiety in ventilator-dependent patients. ***Heart & Lung***; **30**:376–387.

Yung P., Chui-Kam S., French P. & Chan T., (2002). A controlled trial of music and pre-operative anxiety in Chinese men undergoing transurethral resection of the prostate. ***Journal of Advanced Nursing***; **39**: 352–359.

Yun K.L., Sintek C.F., Fletcher A.D., Pfeffer T.A., Kochamba G.S., Mahrer P.R. & Khonsari S., (1999). Time related quality of life after elective cardiac operation. ***Ann Thorac Surg***; **68**:1314–20

Zald, D.H. & Pardo, J.V., (1997). "Emotion, olfaction, and the human amygdala: amygdala activation during aversive olfactory stimulation". ***Proc Nat'l Acad Sci (USA)*** **94** (8): 4119–24. [doi:10.1073/pnas.94.8.411](https://doi.org/10.1073/pnas.94.8.411).